Coal Age



Training Key Men Coal Show Report "Continuous-Face" Mining e Park Fine-Coal Plant e Gob-Fire Control
Shooting With MS Connectors e Aluminum Pipe in Low Coal
Powder-Power at Vesta e New Continuous Unit e Haulage Trends

hot war.

cold war...

either one means

more coal *

A thousand-and-one new kinds of military equipment to be preduced...a thousand-and-one new needs for coal! The rearmament plans to take about 530 million tons this year alone. And you know your mine will be working under pressure, as the program really gets under way!

That's why you should consider constant haulage mine cars now. Remember—a troublesome car doesn't stop your coal from moving. Shunt it off onto a siding...all the rest of your cars keep hauling coal. Mine car breakdowns won't shut down your mine at the time your coal is needed most?

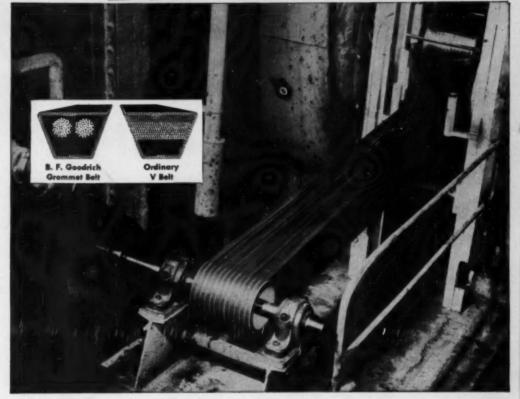
Q.C.f.

MINE CARS

1010

If you are planning a new or streamlined hashage system, get the complete facts on the ndvastages of a complete mise car system. Four C.C.F. Representative will glodity get them for you. American Car and Foundry Company, New York : Chicago - B. Louis - Cloveland Philhodolphia - Huntington, W. Vs. - San Francisco

r Constant Haulag



Belt service tripled by changing to B. F. Goodrich grommet belts

B. F. Goodrich grommet V belts cut costs 20 to 50%

O RDINARY V belts on this drive (a big fan for drying grain) lasted 1674 hours. The company wanted to cut costs by getting longer life from belts so they called in a B. F. Goodrich man and B. F. Goodrich grommet belts were installed. Grommet V belts ran 5153 hours . . . more than three times longer than ordinary belts. Why is this a typical example of grommet belt performance — why do grommet V belts outlast other belts?

Endless - A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping cord sections. Because most of the failures in ordinary V belts

occur in the region where cords overlap, the endless grommet belt eliminates such failures.

Concentrated cord strength - All of the cord material in a B. F. Goodrich grommet belt is concentrated in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip - Because a grommet is endless, a grommet belt is more flexible, grips the pulleys better. Size for size, grommet belts will give 1/3 more gripping power, pull heavier loads with a higher safety factor.

Only B.F. Goodrich has the grom-met! — No other multiple-V belt is a grommet belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B.F. Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. The B.F. Goodrich Company, Industrial and General Products Division, Akron, Obio.

Growingt Betts

B.F. Goodrich

RUBBER FOR INDUSTRY

The Champion:

The world wondered at their

FLATNESS!



never been revealed!

THESE BLOCKS

ARE

UNSUPPORTED

WHY

DON'T THEY

FALL?

It was Carl Edvard Johansson who first astonished the world by the flat surfaces of his gage blocks. Annoyed by minute inaccuracies in old time gages, he perfected gage blocks so miraculously accurate, flat and smooth they would stick together and could be held herizontally, in defiance of gravity, like a solid bar, merely by pressing their surfaces together! Johansson never divulged exactly how he achieved that precision, althe we de know he finished his original blocks at home on a cast iron wheel attached to his wife's sowing machine! "Johansson gage blocks" are now made by mastern mathock in America.

HULBURT GIL & GREASE COMPANY, PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

The Champion



"The Champion" GREASE

Speaking of smooth surfaces — there's nothing that makes coal mining machinery run smoother than Hulburt Quality Grease! What you DON'T want is for things to stick together and cause friction—so what you do need is Hulburt Grease to block friction troubles. There's no "secret" as to Hulburt Grease superiority. It's simply a case of making a single Quality product to do just one thing to tubricate coal mining machinery! and, like Carl Johanneen, do it supremely well!

LOOK WHAT YOU CAN DO, NOW!

You can get your fine coal dry — as dry as ever has been obtained mechanically; and you can do it for as little as a nickel per ton.

You can get complete recovery of all your cleaned fine coal. Refuse only is wasted.

You can close the water circuit 100 per cent. Bleeding of water from the plant is eliminated.



WITH THE BIRD COAL FILTER

Ask us to mail you a copy of our Report
"Recent Advances In Fine Coal Drying And
Water Clarification In Coal Preparation
Plants", telling how these long desired
results are actually accomplished.



BIRD MACHINE COMPANY

SOUTH WALPOLE . MASSACHUSETTS



THIS MONTH'S COVER

TRACKLESS MINING at the new Lida B alope of the Franklin County Coal Corp., Royalton, Ill., is built around rubber-tired loaders such as this. Other facilities include shuttle cars, big drop-bottom mine cars, roof-bolting, and plastic pipe and automatic pumps for drainage.

ALSO IN THE WORKS

e Preparation, Pumping, Ventilation and Supervision—Previously announced and now scheduled for the July issue are these features: air-cleaning by the Kemmerer Coal Co.; factors involved in dustproofing coal with ell; turbine-pump advantages in mine drainage; a simplified method of making barometric ventilation surveys; and how to get the most out of meetings of supervisors. Additional material scheduled for July or subsequent issues includes:

e Parallel - Tandem Stripping— How a modification of the system pioneered by the Maumee Collieries Co. increases shovel operating time. • Medera Shops for Medera Mining—How Hudson Coal and Old Ben have gone about designing and equipping, respectively, a central shop for a group of mines and an underground shop for a single mechanized operation. • Efficient Trip Changing—How a

 Emcient Trip Changing—How as new trip-changing device gets results at a highly mechanized mine.
 Safety—How two mining companise handle two phases of safety work: introducing new men to their jobs and stimulating safety thinking.

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TEXACO LUBRICANTS

June. 1981 . COAL AGE

MORE COAL FOR YOU...

when hydraulic systems are kept clean with TEXACO REGAL OILS (R&O)

other pydraulic equipment — above or below ground — operate smoother when charged with Texaco Regal Oils (R&O). Switch to these highly-refined, turbine-grade oils and forget about costly stoppages and other ills that beset users of ordinary oils.

Texaco Regal Oils (R&O) have effective additives that inhibit rust and oxidation. Special processing eliminates foaming. Thus, hydraulic systems stay clean—give trouble-free performance. Wear is minimized . . . fewer drainings and overhauls are necessary . . . maintenance costs go down.

For easier starts, smoother rolling and more tonnage hauled, lubricate the wheel bearings in your mine cars with *Texaco Olympian Grease*. Regardless of seasonal conditions, this long-lasting lubricant stays in the bearings... reduces maintenance costs.

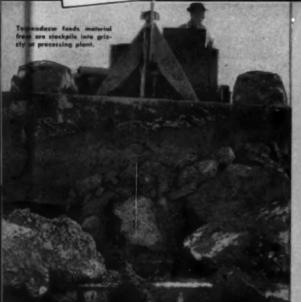
Let a Texaco Lubrication Engineer help you achieve greater efficiency and economy throughout your mine. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

For the Coal Mining Industry

Arkausas Aluminum Plant on 5 JOBS with

- 1 Dozes bauxite ore into grizzly
- 2 Pulls gyp wagon, plant to dump
- 3 Spreads waste material at dump
- A Maintains quarry rock stockpile
- 5 Cleans around two 2½ yd. shovels



Near Little Rock, Arbansas,

a large Eastern manufacturing firm operates an ore pit and processing plant 24 hours a day. They are mining bauxite rock, which must be crushed, then processed to recover aluminum ore. On this multi-handling operation, they have the problem of doing a lot of widely-scattered dozer jobs within very ahort periods of time . . . and have found the answer in a 19 m.p.h., rubber-tired C Tournadozer. "This one LeTourneau machine has been doing the work of two crawlers on our operation," reports the Plant Superintendent.

Tournadozer's principal job during its regular 12-hour work schedule is dozing quarry rock into 4 to 8 grizzlies. It utilizes the previous waiting periods to handle waste disposal . . . pulling a 13-yd. bottom-dump wagon ½ mile from gyp conveyor to dump area . . . spreading the material . . . then returning ½ mile to conveyor, where wagon is uncoupled and reloaded while Tournadozer "lends a hand" on other odd-lot, maintenance-type jobs.

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Mail to: R. G. LeTOURNEAU, INC., Peoria, Illinois	□ 100 h.p., 10	m.p.h. C Tournadeger
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COMPANY	@ Bulldeser	Carrysii
GITY, STATE	Show Flow	☐ Other Drawn Equipment

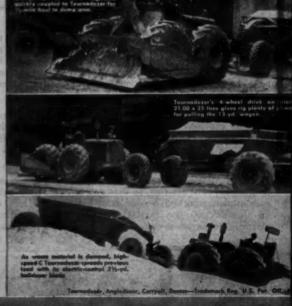
doubles crawler output C TOURNADOZER

Dozing over end of dump, big 4-wheel air brakes stop Teurnalizer instantly appreciate simply moves you selector lover to get high speed reverse which con

In addition, Tournadozer is on call 24 hours a day to level quarry rock stockpile . . . and to clean around 2 electric 21/2-yd. shovels working inside storage sheds. In an average 24-hour period, the "C" travels between 30 and 35 miles, part of the distance over pavement, part crosscountry . . . crosses railroad tracks and curbs without planking . . . works frequently on concrete without damage to surface or to tires.

On all five of these major dosing and pulling assignments, the versatile Tournadorer consistently outproduces crawler-type tractors. Its fast, "runabout" ability has helped maintain steady, balanced production of pit and plant at all times.

With Tournadoser's 19 m.p.h. forward and 8 m.p.h. reverse speeds, you, too, can do more jobs, and get more work done at a lower cost per job. Let your LeTourneau Distributor show you more job-proved facts and figures. Why not write, or call him . . . TODAY!





IT'S RUBBER THAT PUTS THE ACTION IN TRACTIO

Here is the reason



behind
machine-gun
camera
photos like this
BLAST!



Yes, this is a BLAST—and a good one, too! You see no puffs of wasted explosives gas or wild flying rock! And it's the peak of the blast. The rock has moved out 30 to 40 feet from the face, and is ready to drop in a well-broken heap, ready for the shovel.

We've taken hundreds of these pictures, showing several types of blasting—clicked off by our electric machine-gun camera at the rate of three per second. The reason behind them is to show what really happens when a blast goes off—so that you, our customer, can profit from better knowledge of results to be gained from different explosives, different loading and shuoting methods.

This photo, for example, is one of 15 covering this blast of 22,000 pounds of Atlas explosives in a limestone quarry. It shows the ROCKMASTER Blasting System at its best. All 17 holes were detonated from the bottom, alternating ROCKMASTER electric detonators No. 1 and 2 (timed at average 17 milli-seconds apart).

Ask your Atlas representative to show you machine-gun camera photos of other types of blasting, so that you can gain from Atlas' wide experience in pioneering split-second delay blasting. Ask him, too, or write us, for the ROCKMASTER Booklet, showing typical loading diagrams for blasting rock, coal, ore... on the surface or underground.

| ROCKMASTER **16" | TIMINGS | Bushmarter No. | Bushmarte

HON'R MANTER: Box, U.S. Pat. Off.

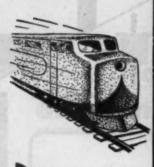
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EXPLOSIVES

"Everything for Blasting"



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KEACHING OUT 20 MILES TO LEAD A TRAIN

Railroad signal and communication engineers require dependability above all other things in the equipment which they buy. When it comes to signal cables, which are the vital connecting links between control machines and signals, they have a serious problem. If the cables are installed in the air they are subject to cinders, sparks, heat, sunlight, sleet and rain. If they are installed underground, the cables must be able to withstand long-time exposure to water, soil acids and alkalies, vibration from passing trains, and the cutting effect of sharp cinders. This is brutal punishment. So how to get trains through safely

and on time — not once, but every day in the year?

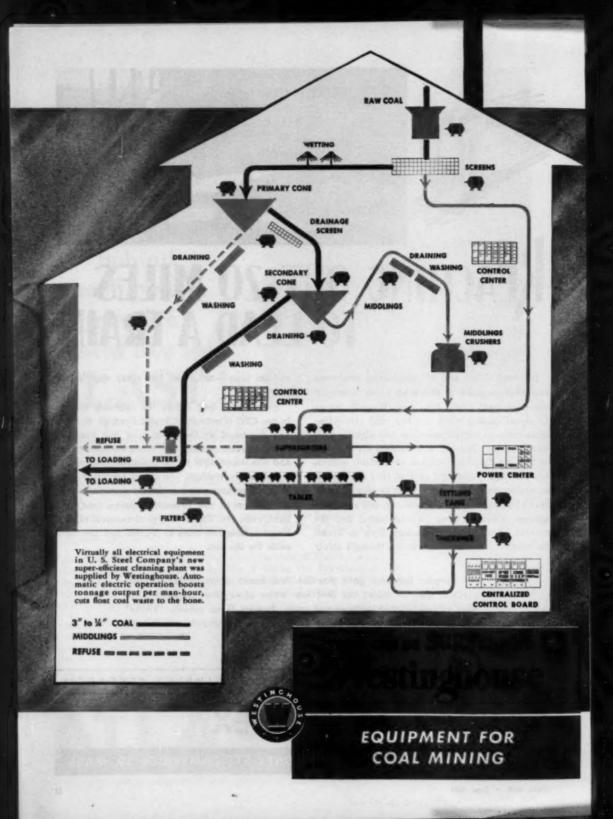
Fortunately, long before the railroads started to use CTC (Centralized Traffic Control) Simplex had developed an insulation that had excellent properties for signal and communication work and was dependably water resistant. That solved the moisture problem. The use of especially compounded neoprene as a jacketing material solved the problem of how to combat sparks, heat, sunlight, rain, etc. This is a typical example of how Simplex Research helps to provide just the right cable for the job.

Simplex Research gave you the first heavy duty, rubber-jacketed portable cord or cable; the first low water absorption insulation; the first rubber-jacketed underground cable. Besides these notable "Firsts" Simplex Research has provided a great many developments which have enriched the art of cable design.

SIMPLEX-ANHYDREX IS A PRODUCT OF SIMPLEX RESEARCH

SIMPLEX-ANHYDREX

SIMPLEX WIRE & CABLE CO. 79 SIDNEY ST. CAMBRIDGE 39. MASS



How Automatic Operation Cleans 650 Tons of Raw Coal Per Hour

One of the world's largest, U. S. Steel Company's new cleaning plant at Robena, Pennsylvania turns out 650 tons of high-grade metallurgical coal per hour.

The last word in modern, efficient operation, the plant all but runs itself. The U. S. Steel Company and their cleaning plant designers, McNally Pittsburg Manufacturing Corporation, did a top-flight engineering job. And practically all the electrical equipment was supplied by Westinghouse, the electrical manufacturer with widest cleaning plant experience.

Plant Run by 18 Men. The basic secret of this outstanding operation is automatic, centralized control. A few buttons are pressed and the complex related equipment is started automatically, in just the right order. There's no time lost by men following check charts and running all over the plant. This reduces the chance of human error and, most important, it boosts output per man-hour. Only 18 men on each shift run the entire operation.

Smooth Operation, No Pile-ups. Once underway, plant operation is kept safe and smooth by additional electrical controls. If a piece of equipment becomes overloaded, a siren sounds to inform the operator. If the overload persists, coal feed to the unit is automatically stopped to prevent pile-ups. If the unit still remains overloaded it automatically shuts down to prevent damage.

Ploof Cool Losses Minimized. Another major advantage of automatic electrical control and first-rate equipment engineering is reducing the amount of coal sent to the refuse pile. It can't be eliminated entirely—but losses of float coal are kept to a minimum.

Call Your Westinghouse Office. When you're planning a new plant to turn out better coal and increase sales, make sure you get the best in electrical equipment. It makes a big difference. Call your Westinghouse office early in the planning stage. Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pennsylvania. 194448



Raw coal feeders are driven by Westinghouse motors and speed reducers. Motor speed is varied by remote control to adjust the rate of coal fed to the plant. All motors in the Robens cleaning plant are the treally-restread, for cooling type.



Incoming power enters these efficient, spacesaving Westinghouse power centers. Major elements are protective switchgear, ASL dry-type transformers (safest transformer ever built), feeder circuits to Jocal

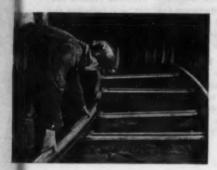


How does he remember which mosters to scart first? He doesn't have to. Sequence-motor-starting automatically starts complex related equipment in the right order. Individual motor control is also provided for testing and medial operations.

How to



TRACK-LAYING TIME



43

Would you be interested if someone told you that three hours' work could be done in a single hour? That thirty hours of working time could be reduced to ten—with improved results?

Many of today's mines are saving in just that ratio when installing Bethlehem prefabricated track. It has been demonstrated over and over that a Bethlehem prefabricated layout can be installed by inexperienced men in one-third the time required for cutting and bending rail in the field and then assembling. This is true even when the operations of cutting, bending, and subsequent laying are handled by trained workers.

Skeptical? You needn't be, for actually there's a solid reason behind that figure. The reason: Bethlehem prefabricated track is tailored to the individual mine after a careful study of the workings by Bethlehem track engineers. All rails are precurved to proper radii and cut to proper length before shipment. They are marked with welded bead numbers keyed to

corresponding numbers on a blueprint, so that the job of assembly is made even simpler.

And when you finish putting the track together, you have track that is properly aligned right up to the working face—track that will stand up easily under the great loads of modern cutters, loaders, 20- to 35-ton motors, and high-capacity cars.

Bethlehem prefabricated track can be furnished with light or heavy rail, whichever you prefer . . . 20-lb and up. Complete in every detail, it includes not only rails but switches, switch stands, turnouts, braces, guard rails, frogs, steel ties, joint bars, even the bolts and nuts. Ask us for full information.

BETHLEHEM STEEL COMPANY

On the Positic Coast Bathlehom products are sold by Bathlehom Pacific Coast Steel Corporation. Export Distributory Bathlehom Steel Export Corporation



Meet your Belt's Worst Enemy

MILDEW

WHEN a conveyor belt fails — won't hold fasteners and becomes full of soft, circular-shaped "mushy" spots — don't blame stone bruises or high tension for the carcass failure. For the truth is—as the G.T.M. proved over 20 years ago—the cause is mildew.

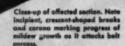
The Goodyear Technical Man can show you proof positive that this cancerous "rot" of the tension member of a belt is the chief cause of premature belt failure of ordinary conveyor belts. Its growth is promoted by darkness, intermittent belt use, dampness, lack of ventilation and the prevalence of uniform moderate temperatures.

The G.T.M. and the "Cancer Cure"

But mildew doesn't attack Goodyear conveyors. Why? Because Goodyear offers you completely mildew-inhibited construction in all styles of conveyor belts. This special treatment—developed by the G.T.M. and proved by more than 20 years of service in thousands of belt installations—is one more reason why Goodyear belts give longer, more trouble-free service—and why more tons, the world over, are carried on Goodyear Conveyor Belts than on any other kind.

If premature belt failure is plaguing your conveyor operations, it will pay you to ask the G.T.M. for the story of mildew conquest. Get in touch with him through your nearest Goodyear Distributor, or by writing Goodyear, Akron 16, Ohio.

FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LIMING, RUBBER-COVERED ROLLS built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.



Stripping cover of conveyor belt showed mildew growth — the light colored cross surrounding the darker and indication the site of eater.



GCODYEAR INDUSTRIAL RUBBER PRODUCTS

-Specified coal-flo Conveyor BELTS

for UNDERGROUND SÉRVICE IN COAL MINES

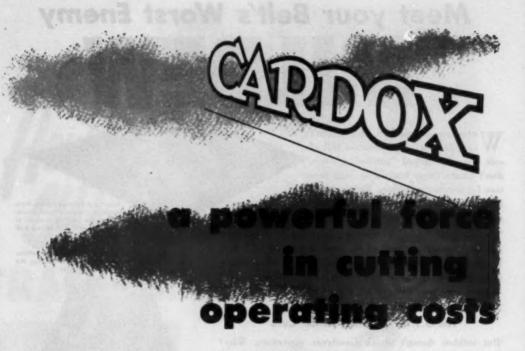
A Tough, thick cover of acid resisting rubber rubber B sturdy, horseshoe-shaped breaker wicking maisture from fraying and C Multi-plies of strong sturdy tabric

D Rubber skim-coat between pile increase, flex life Mildewinhibited throughout far protection-against destructive effect of protec-

GOODFYEAR

THE GREATEST NAME IN RUBBER

Cap Fis-7. M. The Goodpear Tire & Robber Company, Akres, Only



ATTRIDION OF CATRIDIONS

substitute the powerful yet gentle force of expanding air or carbon dioxide for the shattering blast of explosives. This opens the way to unique operating and distribution economies.

Savings start at the face where coal is rolled forward in a loose, easily handled pile, containing a higher percentage of premium sizes. Proportion of fine coal that may be lost in washing is reduced.

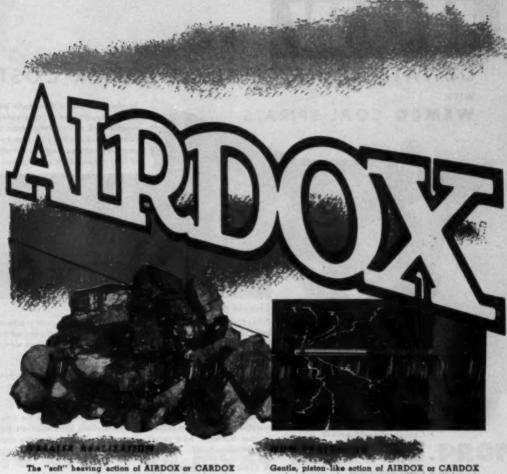
Savings increase all along the line. This coal keeps its size and firm structure through extensive mechanized handling, long distance shipment and rough treatment in the dealer's yard.

AIRDOX is a special application of compressed air; CARDOX utilizes expanding carbon dioxide. Methods of use at the face are similar. Both are widely accepted for their greater safety which permits on-shift use. Which of the two is best suited to your operations should be determined by a conference of our engineers and yours.

Ask for such a meeting. No cost or obligation, of course.

Write for descriptive bulleties of descriptive for descriptive details and ASK FOR a free survey by a Cardox Corporation

CARDOX CORPORATION
BELL BUILDING . CHICAGO 1, ILLINOIS



results in more premium size coal that resists degrada-tion and commands top preference. No smoke, flame or fumes. Work can be resumed right after the fall.

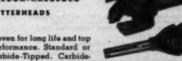
Gentle, piston-like ection of AIRDOX or CARDOX produces more loose, economically handled coal. Freedom from shatter crecking protects roof and ribs of the mine.

CARDOX-HARDSOCG DRILLING EQUIPMENT

RECOVERY



Salvages profitable tonnage where overburden removal has become too costly for further stripping. Cardox-Hardscog Augers carry the coal in continuous flow from the sam. Hookad up with portable conveyor as shown, they provide automatic loading for cars or trucks. Avail-able in diameters of 20° to 40°. CARDOX-HARDSOCG CUTTERHEADS



Proven for long life and top

performance. Standard or Carbide-Tipped. Carbide-Tipped Cutterheads may be had with recessed core breaker as shown, or extended pilot and with spline, square or hexagon connections.

Other Standard Cardox-Hardsocy Drilling Equipment: Augers from 2" to 8" in diameter, bits, wedges, thread-bars, sockets, boxing and boxing liners.

NOW

DEWATER FINE COAL AT LOWER COST

WITH

WEMCO COAL SPIRALS

Serving the same functions as settling type tanks of far greater mechanical complexity, WEMCO COAL STRALS are simpler, less expensive machines used in a variety of coal preparation applications.

DEWATERING AND DESLIMING

- Pea, buckwheat, rice, and barley coal or refuse
- No. 4 and No. 5 buck coal or refuse
- Coal or refuse, 65 mesh to 1½ inch
- · Table feed
- Heavy density fines
- Fine coal feed to frath flatation

Simple operating principle

Feed (coal and water) enters the side of the tank;
 water overflows carrying slimes, and
 coal settles in the tank and is conveyed up the incline with a turning squeezing action to eject and drain free water.

Balanced capacity

WEMCO COAL SPERALS provide a balanced settling operation, combining a large settling pool with a high capacity spiral raking mechanism.

Low operating costs

WEMCO's simply mounted spiral shaft contrasts sharply with the innumerable wearing points in the links, chains, pivots, drive sprockets, etc. in other machines. As a consequence, power and maintenance costs are greatly reduced.

A size for every need

A choice of various spiral diameters, pool sizes, and spiral designs are combined to provide correct machines for a wide range of conditions and requirements. weemco COAL SPIRAL capacities vary with size—dewatering up to 6,000 g.p.m. at 28 mesh (1,500 g.p.m. at 65 mesh)—conveying up to 240 t.p.h. (% x 0" cool, sp.gr. 1.8).

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HYDROSEPARATORS HMS LABORATORY UNITS DEWATERING SPIRALS AGITATORS SH CLASSIFIERS THICKENERS SAND PUMPS



O GIVE YOU MORE YEARS OF P



MAGNETORQUE ELECTRIC SWING SAVES YOU TIME, TROUBLE, MONEY!

Bring on your heaviest going! The 955-A is ready for it! It's the 21/2 yd. companion of the famous P&H 1055 - with all its proved engineering - tough all-welded construction - greater stability - live roller circle - adjustable hook rollers - and many other advancements that assure years of hard service with minimum cost.

Operating advantages? More than you've ever known in a machine of its size. Magnetorque Swing does away with the old swing frictions - with all their *T. M. of Harnischfeger Corporation for electro-magnetic type clutch.

headaches - forever. It's faster - 15% to 25%

Ask us where you can see one in operation. Learn what "ROCK RATED" really means.



EXCAVATORS

4540 West National Avenue Milwaukee 14, Wisconsin

RNISCHEEGE

EXCEVATORS - CVERGEAS CRAMES - MOISTS - ARC WILDER AND DESTROAGE - SOIL STABILIZERS - CRAWLER AND TRUCK CRAMES - BIESEL EMBIRES - CAN'L LEADERS - PAR ASSEMBLY BE

You can "EUCS for Amendon EUCS for

MORE PROFIT IN EVERY PAYLOAD!

Rear-Dump Euclids are designed and built to

Rear-Dump Euclids are designed and built to move rock, coal, ore and overburden and other heavy excavation at the lowest cost. Easy loading ...large capacity...speed on the haul road and dump...long life in heavy duty service... these are some of the Euclid features that mean more pay in every payload.

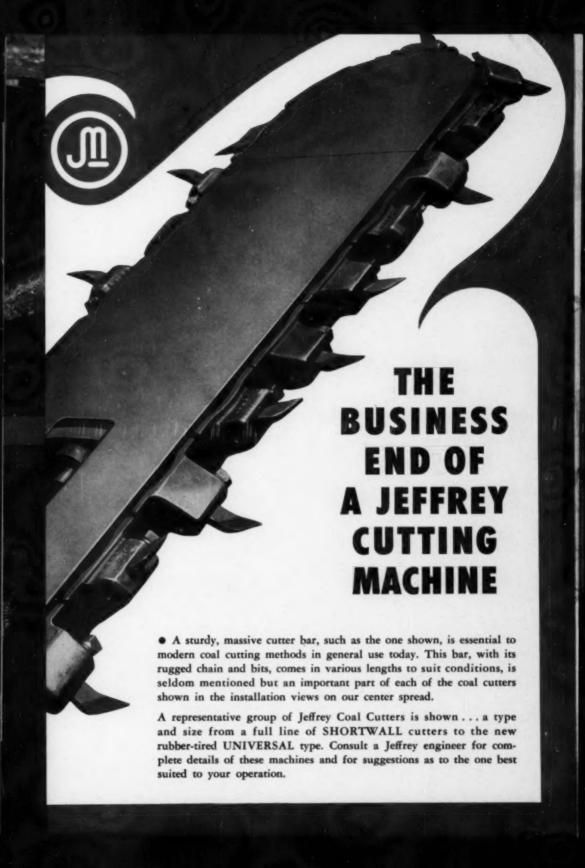
There are models for every off-the-highway hauling requirement. Some of the variations in models that are available include five or ten speed transmissions...semi-rigid or spring mounted drive axles...manual or hydraulic booster steering...standard or quarry type body.

Excellent parts and service facilities of a worldwide distributor organization are quickly available... assure prompt, efficient service when needed. For full information on the Euclid line of earth moving equipment call or write today.

Securing 52 hars of Iron on into the sension on the Minnesola fron Rango— Fradal TD finelid.

A 5-yerd shavel loading 30 tens of any execution into a Model LD its

The EUCLID ROAD MACHINERY Co. Cleveland 17, Ohlo









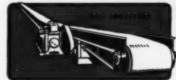
















JEFFREY

EQUIPMENT FOR COAL MINES

THE JEFFREY MANUFACTURING COMPANY

Established 1877

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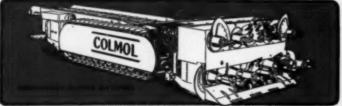
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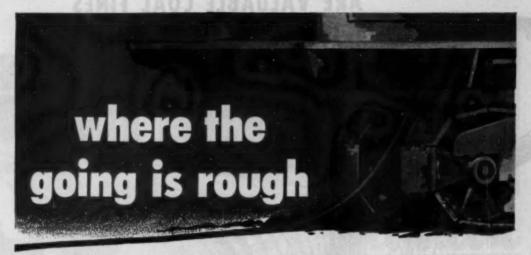
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JEFFREY MFG. CO. LTD., Montreel, Conedo JEFFREY-GALION (PTY.) LTD., Johannesburg, S. A. THE OHIO MALLEABLE IRON CO., Columbus, Ohio BRITISH JEFFREY-DIAMOND LTD., Webefield, England THE GALION IRON WORKS & MFG. CO., Gollon, Ohio THE KILBOURNE & JACOBS MPG. CO., Columbus, Ohio





USE G-E GEOPRENE PORTABLE CABLE

Reel'em out, reel'em in—trailing cables must take super-punishment in mining operations. To keep your shovels, loaders, and other machines going full time, get acquainted with General Electric Geoprene portable cable.

Designed to take the treatment handed out in mines—strip or underground—this sturdy cable has greater tensile strength than called for by ASTM standards—more tear resistance than found in ordinary rubber compounds! The resilient construction—durable insulation, double-laid twine reinforcement, and strong Geoprene jacket—gives the kind of toughness you need. Built for continuous operation under heavy current loads, G-E Geoprene portable cable is furnished with one, two, three, or four conductors in a wide range of sizes.

For a big, new, free booklet listing all G-E mine cables, write for General Electric Cables for the Mining Industry. Address Section W 54-614. Construction Materials Department, General Blectric Company, Bridgeport 2, Connecticut.

Compare - and be convinced!

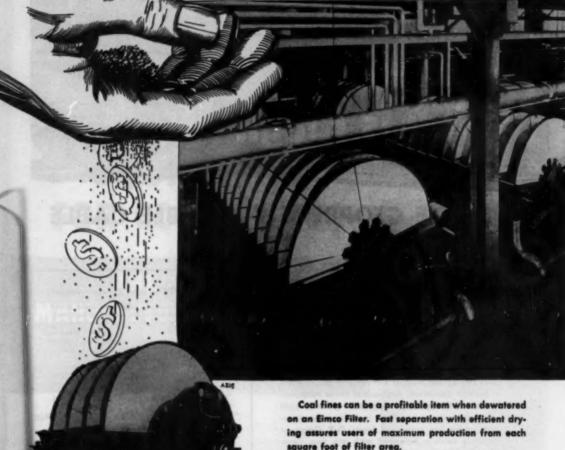
These figures, comparing ASTM requirements with typical G-E Geoprene values, indicate at once the superiority of portable cable with Geoprene sheath:

Original	ASTM Require- ments	Geoprene Typical Values
Tonsile strength, lb/sq in.	1800	3000
Per cent elongation	300	500
Set in 2-in, test piece, in, After 7 days in Geer even at 70 C.	3/8	1/16
Tensile strength, lb/sq in.	1400	2900
Per cent elongation	250	430
After 96 hr in oxygen bomb at 70 C.	-	10000
Tensile strength lb/sq in.	1600	2800
Fer sent elongation	250	430
After 18 hr in all at 121 C. Per cent depreciation		
in tensile strength Per cent depreciation	40	35
in elongation	40	35
Tour Test	100	-
Tensile strength, min lb/ln.	40°	75

This is the requirement for multiple for the first state of spice works has you been set for no protective for soften for

You can put your confidence in _
GENERAL BELECTRI

ARE VALUABLE COAL FINES SLIPPING THROUGH YOUR FINGERS?



square foot of filter area.

Eimco will produce a clear filtrate which will not be objectionable in States where anti-pollution laws

As a free service to companies considering the use of coal saving equipment we invite you to send samples to our complete filtration laboratory for a test in filterability - write for shipping instructions.

It will be a privilege for an Eimco engineer to consulte with you on filtration problems.

You can't beat an Eimeo!



THAT HAVE EARNED
A REPUTATION

for . . .

Outstanding performance

Long life

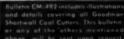
The Type 512 Shortwall, a proved leader for undercutting real, is a thoroughly modern machine. Its most modern features are described in Bulletin M-512.

roodman

has been building them for years

Shortwall machines built by Goodman and in current use, range from the oldest to the newest designs introduced over the past four decades. Many of these machines are "doing better than ever." Their owners have consistently taken advantage of improvements and accessory equipment made available through Goodman's progressive field, engineering and manufacturing research.

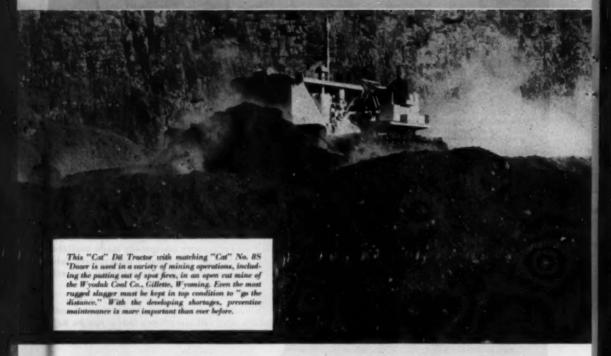
Today, as in the past, you can purchase a machine with full confidence that it can be kept at its best throughout its lifetime of service.



GOODMAN MANUFACTURING COMPANY
HALSTED STREET of 48th - CHICAGO 9, ILLINOIS

CUTTING MACHINES . CONVEYORS . LOADERS . SHUTTLE CARS . LOCOMOTIVES

There's a big



IF YOU WANT TO HELP YOUR COUNTRY— AND YOURSELF AT THE SAME TIME— READ EVERY WORD ON THESE TWO PAGES

Keeping equipment on the job is of prime importance today—to the nation as well as the coal-mining industry. More than last year's 430 million tons of bituminous coal (alone) must be mined to meet the demands of defense and geared-up industry. For coal is needed to make steel and scores of other things America needs right now.

And right now there is a shortage of materials with which to build urgently needed machines and parts. Military and Defense Rated Orders get the nod over unclassified civilian needs. Steel and other materials are in short supply. This means that you—with our help—must get every last machine-power hour out of the equipment and parts you now have.

Down-time will not only weaken the defense effort, it can mean costly delay to the mine operator too. "Cat" machines are built to wear, but coal-stripping is tough on equipment, and proper maintenance gives longer service life to the most rugged machines. It's money in your

pocket to use 'em right and treat 'em right—especially at this time.

So to stay in business profitably, and help America arm for defense, do these things now:

- Use equipment properly. "Cat" machines are built for hard use—not abuse.
- 2 Give extru attention now to preventive maintenance (see next page).
- 3 Discuss your parts needs and maintenance problems with your "Caterpillar" dealer. His maintenance responsibility begins where your operators' and mechanics' responsibility ends. He has the skilled servicemen and equipment to rework and rebuild worn parts to keep your machines on the job longer.

CATERPILLAR TRACTOR CO. . PEORIA, ILLINOIS



The last war should the Military that "Cat" Earthmoving Equipment was as important to defense and offense as tanks. Here Sg. Robert Chrisman operates a "Cat" D7 Tractor with matching blade on Davison airstrip at Ft. Belvoir, Va.

ob ahead

You're

the

Doctor

Today no owner can afford to think of direct costs alone. Good care of equipment can mean the difference between a producing machine and one laid up for repairs. To see how good care can save many hours of equipment life, reread your Operator's Instruction Book often and follow these suggestions.



DUST

Think of dust as Machine Enemy No. 1. A few grains today faw more temorrow—and soon the result adds up to serious we Dust or dirt plugged breathers or six element—use of dirty ell or tainers—lose intake manifolds—lose inspection covers—disturb compartment—failure to wash flywheel clutch compartment—failure to wash flywheel clutch compartment—worm seals on orankshaft—defective gaskets—failure to obean filter openings... these are some of the vulnerable spots.



. TRACK ASSEMBLY

Den't lot abusive use or neglect cripple the service life of your track assembly. Track adjustment and lubrication of rollers, carrier rollers and idlers are your job. Before excessive wear occurs on grousers, links, pins, bushings, idlers, collers and aprockets, call in your "Caterpiller" dealer. He can build up grousers, rollers, idlers and links, and replace sprocket rims and turn pins and bushings so you will have many additional hours of service.



· CYLINDER HEADS

Prevent cracked cylinder heads by avoiding overheating, freening, scale deposits, filling a hot engine with cold water, pulling heads down too tight, and other poor maintenance practices. Your "Caterpiller" dealer can repair most cracked cylinder heads. He can replace worn valve seats with valve inserts and restore the rocker arm mechanism to serviceable limits. Consult your Operator's Instruction Book for proper cooling system and valve care.



COOLING

Don't let your engine overheat. Keep the cooling system free scale, rust and sediment. Use soft or treated water, and what freeing temperatures exist, protect your engine with anti-freest Clean the radiator regularly with chemical flushing solution Remove foreign matter from the core by brushing or washin Prevent engine troubles which come with overheating. Consequently over Operator's Instruction Book for proper cooling system our



LUBRICATION

Careful lubrication practices will add much to your estimact through equipment performance, economy and long life. Use of recommended lubricants, changing the lubricant at proper int vale. And use only "Caterpillar"-proved filter elements. Reme dirt from fittings and clean around the crantcase filter cap befined adding oil. A little care caves many hours of engine life. Came the lubrication chart in your Operator's Instruction Book.



. PISTONS AND LINERS

Almost all the piston wear occurs in the upper ring groove. You "Caterpiller" dealer can renew your pistons by machining th upper ring groove for a wide ring, many sizes of which are chross plated. Worn liners can be deglased and put back to work for man additional hours of service life. Consult your Operator's Instruction Book for information on Inbrication and the oil cooling system.



DIESEL ENGINES . TRACTORS . MOTOR GRADERS . EARTHMOVING EQUIPMENT

on TOUGH jobs, this SUPER oil can

DOUBLE

BETWEEN OVERHAULS

If your engines operate at high speed, high temperatures, under shock and overloads... or if they operate at low engine temperature because of light loads, long idle, lots of stop-and-start—there is a lubricating oil made for you—Sinclair SUPER TENOL.

Sinclair lubrication specialists developed this lubricant expressly to keep engines clean and lengthen engine life, under all operating conditions—heavy load...light load... or idle. And they succeeded!

Operators report, using SUPER TENOL, they have more than doubled engine life between overhauls.

Figure what this can mean to you: cuts the overhaul downtime in half

For lubrication help, see your local Supplier of Sinclair Products or write to Sinclair Refining Company, 630 Fifth Avenue, New York 20, N. Y.

... more productive output per engine... lowered operating cost!

Better plan to change to SUPER TENOL right away!

ENGINE LIFE



COAL AGE . June, 1951

GET LONGER CARBIDE more coal per tool at

A few of many valuable principles of mining-tool care that your men can learn at the Carboloy Customer Training School or from our technical literature.

Use only silicon carbide wheel to grind be carbide tip. This will avoid checking and cracking of carbide.



2 Use only aluminum axide wheel to grind steel shank. (Silican carbide wheel would place and lead.)



3 Grinding before bit is wern too far makes sharpening easier and faster, gives lenger tool life.



4 Using bit when it's worn too far requires more power, puts heavy burden an mining machine, westes carbide.



5 Set tool to shortest practical gauge. Excessive gauge setting causes tool to



6 Don't hommer carbide tip when breeling teel loose from event.

ith the right care, Carboloy Coal Mining Tools will work on and on—cut coal for you more economically, more efficiently, ton after ton after other tools give out.

Use these FREE Carboloy Company Services

To help your men learn the proper maintenance, grinding, and general care of carbide coal mining tools, Carboloy Company has established a comprehensive service program that includes:

- A clear, concise maintenance instruction manual—Catalog CM-100.
- The assistance and advice of Field Engineers and your local distributor.
- 3) A complete training course for your key personnel.

The Carboloy Company tuitionfree course offers a program of instruction in correct grinding practice with demonstrations and individual work, provision for discussing with your men the carbide tool problems of your company.

Write For Information

For uniform, high-quality Carboloy Coal Mining Tools and more information about Carboloy's cost-cutting, life-lengthening tool conservation services, see your nearest Authorized Carboloy Distributor. Or write direct.

MINING-TOOL LIFE lower tool cost per ton

Carboloy Coal Mining Tools — made of Carboloy Cemented Carbide, hardest metal made by man — are lab-designed, mine-proved for freer, faster cutting. Uniform, high-quality inserts assure longer bit life through heavy use and many, many regrinds.

Carboloy's improved Roof Bolting Drills



TWO-PRONG TYPE

For drilling through softer rods, such as shale, bony and laminused sendstone. Available in two sizes—1½" and 1½". Rugged double pronas lipped with Carbolay Camented Carbide assure longer drilling life, Exclusive Carbolay design achieves maximum efficiency.



SOLID TYPE—for faster, easier drilling in hard slate, hard shale, iominated limestone, and measive sendstone. Sizes 19% and 19%. Tipped with Carboloy Cemented Carbide—the hardest metel made by man—to give maximum speed in roof drilling. Develops faster rotary drilling speed then pneumatic methods. Improved that design to remove cuttings faster, alloy steel body for greater.

Improved FINGER BIT—For strip, underground mining - Perfect for use in hard-to-take-hold-of medium ground! - Real gauging action; filts all standard auger drift heads using ½" bits. Other plus features Paster cutting due to larger clearance angle on shonk + Drills more freely - Less pressure required + Uniform high quality throughout entire tip + Alloy steel shonk, beat-treated.

Improved AUGER DRILL BIT— For post mounted and push driffel Now ave lable in size 136", as well as 136", 2", 216". Check these quality features Maximum clearance and raise angles permit freer, faster criting. • Improved spiral prevents packing of coal critings • Uniform high-quality carbide throughout entire tip assures langer bit life • Long tips of Carbolay camented carbida permit many more regrinds • Forged allay steel shark.

MINING MACHINE BIT—Eight important advantages: Shank level with insert for free flow of ocal • Less shank steel to grind, yet adequate insert support • Less carbide to grind; faster grinding, greater fip economy • Smaller point for less power consumption • No shoulders; set to any gauge size within range of use • Maximum hold through combination of braze and mechanical holding • Approximately 50% greater thickness of insert at auting edge • Aflay steel shank, heat-treated to maximum physical strength; permits set screw clamping.

CARBOLOY COMPANY, INC.

A General Electric Affiliats
11120 E. 8 Mile Ave., Detroit 32, Michigan

"Carbaloy" is the trademark for the products of Carbaloy Company, Inc.

Opecify

CARBOLOY

THE QUALITY BRAND OF COAL MINING TOOLS



AT LOWEST POSSIBLE COST PER TON

SALES ENGINEERS IN — Whitesburg, Kentucky — West Frankfort, Illinois Charleroi, Pennsylvania — Denver, Colorado — Big Stone Gap, Virginia Danville, West Virginia — Canton, Ohio — Birmingham, Alabama Helper, Utah — Kansas City, Missouri — Centerville, Iowa — Topeka, Kansas New Castle, England — Alberta, Canada

BOWDIL

CANTON, OHIO

WIRE ROPE



Roebling rope is the A-1 specification in the mining fields

FOR EASY HANDLINC, extra toughness and service life, there's nothing like Roebling Preformed "Blue Center" Steel Wire Rope. "Blue Center" steel—made only by Roebling—gives rope top resistance to abrasion and fatigue. And Roebling Preforming gives you a rope that spools better...doesn't tend to set or kink...minimizes vibration and whipping.

There is a Roebling wire rope of the right construction, grade and size for every type and make of rope-rigged equipment. Have your Roebling Field Man help choose the rope that will give you the best, low-cost performance. Further savings may be effected by following his suggestions on installation, use and maintenance of wire rope. John A. Roebling's Sons Company, Trenton 2, N. J.

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Ave, S. & Tulse, 321 N. Cheyonne St & Export Soles Office, Treathen, N. J.



ROOM...MOTHER...OR SLOPE





SINGLE OR TANDEM DRIVE

Hewitt-Robins Mine Conveyors come equipped with both single and tandem pulley drive elements. Provide ample horsepower for lift and length up to the very limits of belt capacity. Reeving of belt handles level, uphill or downhill service requirements.

UNIFIED DRIVE SECTION

Motor, reducer and controls mounted on a single base skid-designed for easy moving about. Can be located on either side of the conveyor. Drive reversible—incoming for men and material, outgoing for high output of product.



there's a Hewitt-Robins Mine Conveyor to meet your specific requirements

Solve your underground conveying problems the easy, economical way. With a choice of THREE types of Hewitt-Robins Mine Conveyors, you are sure to get exactly the equipment you want.

TYPE I has internal drive for level or uphill operation; in 26°, 30°, 36° and 42° widths—lengths to 3000 feet or more.

TYPE IS has internal drive for level or downhill operation; in 26" and 30" widths—lengths to 3000 feet or more.

TYPE H has head drive for level or uphill operation; in 26" and 30" widths—lengths to 2000 feet.

Intermediate Sections are standard, fit all three types. Assembly is easy—both ends are identical, need no "matching up." Made in 8' and 10' rigid and demountable sections. Also available are Intermediate Channel Sections in 12' lengths—30", 36" and 42" widths.

Only Hewitt-Robins can offer you a complete

mine conveyor "package"—machinery plus belt, motor, reducer and drive! You can order equipment to fit your needs to a "T"—single or tandem pulley drive . . . internal or tail takeup . . . the famous Ajax® heavy-duty belt, in the required length and width.

The sturdy machinery is built for the toughest kind of service. You get ball or roller bearing, one-shot lubrication idlers . . . lagged pulleys for maximum power transmission . . . a conveyor backed by over half a century of engineering and manufacturing experience. And, only Hewitt-Robins leaves you worry-free—takes complete unified responsibility for successful performance of machinery and belt!

Make sure you get the best for your money. Write for detailed specifications. Address: Hewitt-Robins Incorporated, 1010 Pennsylvania Ave., Charleston, W. Va., or 270 Passaic Ave., Passaic. N. J.



INTERNAL TAKEUP



Located directly back of the drive. Handles 10' of belt slack. Operated by reversible ratchet-wrench working on gear reduction to minimize manual effort. Arranged so an automatic counterweighted gravity take-up can be added if desired—eliminating manual adjustment. Double-acting pawl prevents back-up.

NEW 2¼" TROUGHING IDLER has roller bearings. Demountable, easy to assemble under the belt. Triple grease seal locks grease in, keeps dirt and moisture out.



-

TAIL SECTION

Telescopic type to provide tail takeup action. Easy to clean out—no steel work under tail pulley. Has transverse cover to protect pulley, bearings and belt. Strong enough so that you can rest a feeder on it.

MINE CONVEYORS

Hewitt-Robins is participating in the management and financing of Kentucky Synthetic Rubber Corporation.

- HEWITT-ROBIN



INCORPORATED ----

BELT CONVEYORS (builting and manimary) . BELT AND BUCKET ELEVATORS . CAR SHAKBOUTS . DEWATERIZERS . PREDERS . FOAM RUSSER PRODUCTS . FOUNDRY SHAKBOUTS . INDUSTRIAL HOSE . MINIT CONVEYORS . MOLDED BUSSER GOODS . BUSSERLOIT ROTARY WIRE BRUSSES . SCREEN CLOTH . SRIP HOSETS . STACKERS . TRANSMISSION BELTING . VISIGATING CONVEYORS, FREDERS AND SCREENS



THE FIRST REAL PIPE THAT IS PLASTIC!

ONLY CARLON can be installed rapidly where and when mine pipe is needed most. Whether used for emergency service or a permanent installation, CARLON plastic pipe solves costly, time-consuming installation, maintenance, and replacement problems in mines of all types.

CARLON is unaffected by sulphurous waters, alkalies, metallic salts and other corrosive wastes. It is light in weight and can be installed easily.

Guaranteed against rot, rust and electrolytic corrosion, CARLON has a service life many times that of metallic pipe. Its smooth internal surface will not accumulate scale and minimizes frictional loss.

CARLON is produced in flexible and rigid types in all standard pipe sizes. Flexible pipe is

furnished in long lengths which require fewer fittings per installation and which conform to irregular surface contours as well as slope or entry direction. Rigid CARLON is shipped in threaded and coupled random 21-foot lengths which can be joined rapidly by threaded plastic fittings.

A complete line of molded plastic fittings incorporating standard I.P.T. is available for plastic-to-plastic or plastic-to-metal connections. To solve your mine piping problems, specify ONLY CARLON.

At present, raw material shortages are limiting the preduction of certain types of CARLON pipe. Every effort is being made to overcome this problem and to meet the demand and need for CAR-LON...the first real pipe that is plastic.



CARLON PRODUCTS CORPORATION

IN CANADA: MICRO PLASTICS, LTD., ACTON, ONTARIO
10462 MEECH AVENUE . CLEVELAND S. OHIO





If you're responsible for the wire rope on clamshells, shovels or any other earthmoving equipment that operates on small diameter sheaves and drums, J&L CenterFit Wire Rope can help you save money.

CenterFit, produced exclusively by Jones & Laughlin Steel Corporation, has a unique design engineered to give you more steel and fewer voids than conventional wire rope. All strands run in the same direction with outside strands fitting snugly into the valleys between inside strands. The result—greater strength... easier handling... which means longer service life.

In addition J&L CenterFit is lubricated with BRONZ-LUBE, the exclusive J&L lubricant with high film strength that prevents squeezing out between the strands. BRONZ-LUBE contains fine flakes of soft bearing metal that provide a smooth wear-resistant surface for every wire—forms a close adherent coating that doesn't drip off unless subjected to extremely high temperatures.

Users' records prove that J&L CenterFit lubricated with BRONZ-LUBE reduces operating costs, diminishes downtime and increases profits when used in the applications for which it was designed.

AND HERE'S HOW YOU CAN FIND OUT MORE ABOUT CENTERFIT WIRE ROPE!

Just write to Jones & Laughlin Steel Corporation, 411 Jones & Laughlin Building, Pittsburgh 30, Pa., and ask for a free copy of our booklet, "CenterFit." It gives you detailed information on the construction and applications of this exclusive J&L wire rope and tells how others are saving money through its use.



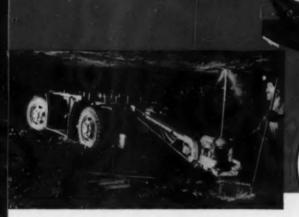
JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full lineal carbon steel products, as well as certain products in otiscolov and JALLOV (hi-tensile steels).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES - STRUCTURAL SHAPES - HOT AND COLD ROLLED STRIP AND SHEETS - TUBULAR, WIRE AND TIN MILL PRODUCTS - "PRECISIONBILT" WIRE ROPE - COAL CHEMICALS ONE-MAN OPERATED ... SELF-PROPELLED

AND WITHOUT AN EQUAL FOR FAST,

ECONOMICAL ROOF-BOLT DRILLING







The JOY RBD-1 HYDRAULIC ROOF-BOLTING DRILL

- ★ Built in 26", 30" and 36" heights. Wherever rotary drills are applicable, the RBD-1 consistently out-drills other types—either pneumatic or electric—producing as many as two-thirds more boles per shift.
- ★ Bottoms your roof-bolting holes with only one steel change in practically all cases. Except in the thickest seams, no other drill will do this.
- *Rubber-tired and self-propelled—equipped with hydraulic controls for *me-man* operation.

 Employs boom feed, and is self-leveling and self-aligning while drilling.
- May be equipped for wet drilling—or with vacuum dust remover, as desired—to eliminate objectionable dust.
- Hydraulic impact wrenches are available, either drill-mounted, feed-leg mounted, or hand-held types. All types derive their power from the machine—have ample torque to drive nuts to refusal.
- ★ SULMET Carbide Bits and Drill Steels designed for the RBD-1 Drill are available.

Consitt a Joy Engineer

W&D CL 3412

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W OLIVER BUILDING . PITTSBURGH 22, PA

IN CANADA JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Above: The 100th
JOY CONTINUOUS MINER
in the plant and on the job

This 100th JOY Continuous Miner, a 3-JCM machine, was shipped in September, 1950 and went on the job a few weeks later, in November—the fourth Continuous Miner in that particular operation. With well over a hundred Miners now in service around the world, each additional machine furnishes added testimony that the JOY Continuous Miner is definitely a field proved unit—established by performance as the greatest single advance in coal mine mechanization today for safety and low-cost, high-tonnage production.

in Highly Successful Use!



JOY CONTINUOUS MINERS

are <u>Cutting Costs</u> and <u>Increasing Tonnage</u> in every coal-mining field from coast to coast in the U.S.-and in several foreign countries.

Let us work with you to secure the best advantage from modern mechanized mining practice in your operations. Consult a Joy Engineer



CL 1475

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING . PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

DRILLS
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Cuttings Removed
by AIR

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JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING . PITTSBURGH 22. PA.

IN CANADA JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

n be run on sm

MORE FLEXIBILITY. Belts built with "Cordura" have less tendency to crack and separate plies when run over small pulleys required in confined working space. And belts built with "Cordura" have less stretch, so less take-up room is needed. In addition, they trough well under any loading conditions.

OPERATING ECONOMIES YOU CAN GET FROM YOUR NEXT CONVEYOR BELT

Before you buy your next conveyor belt, he sure to consider the new belts built on Du Pont Cordura* High Tenacity Rayon. Belts sinewed with "Cordura" offer you many operating advantages . . . yet cost no more.

Just as sinews of "Cordura" make possible thinner yet stronger truck tires, they now give you a conveyor belt that is lighter and more efficient.

That's because "Cordura" is inherently stronger than natural fibers commonly used. And it is made in continuous filaments . . . with no short ends to pull apart under strain.

We'll be glad to send you the names of suppliers of the new belts built on "Cordura." We'll also give you full information about "Cordura" in the new booklet "Sinews for Industry." It describes the physical properties of "Cordura," how it has been used in many successful applications, and tells how "Cordura" improves the efficiency of conveyor systems. For your free copy, address Room 4527, Rayon Div., E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

"MES. U. S. PAT. GFF.



for RAYON...for NYLON...for fibers to come



GREATER STRENGTH of belts built with "Cordura" is illustrated above. At left is crosssection of four-ply belt sinewed with "Cordura." It's stronger than conventional sixply belt at right, yet only half as thick. This thin, light belt is particularly desirable where panel equipment is moved frequently.



SPAN LONGE LIFE, The high tensile strength of "Cordura" rayon eliminates cousty transfer points. For example, a belt reinforced with seven plies of "Cordura" can lift 1000 tons of overburden per hour up a 15" slope over 1000-foot centers. It has design tension of 900 pounds per inch of width.



HEAVIER LOADING CAPACITY is possible on conveyor belts built with Du Pont "Cordors" High Tenscity Rayon. This yarn is inherently stronger than the natural Shers commonly used. It packs extra strength into conveyor belts and enables them to carry loads to the capacity of power equipment.

do
you
want to—

CLOSE YOUR WATER CIRCUIT

and keep it under control?

RECOVER YOUR PLUS 200 MESH COAL

slime free?

the Dorr Clone

-new compact, high-efficiency deslimer-can help knock out two problems in the modern coal cleaning plant...

FIRST—as a classifier ahead of a Dorr Thickener—it will scalp out fine coal down to 150, 200 mesh or even finer. The removal of this fraction enables the Thickener to do a real clarification job—results in a completely closed water circuit without build-up of fines.

SECOND—this fine coal fraction, discharged at 50% solids or better, is readily handled after further dewatering as a usable or salable product.

The DorrClone, properly utilized, is a unique and useful tool. We'd like to tell you more about its exclusive features.



Only the DorrClone has the Vactrol* feature, which automatically insures constant discharge density . . . one of the demonstrated developments that makes the DorrClone capable of controlled and predictable operation.



*DustClone and Vactral are trademarks of the fruit Company

ORR

ORLD - WIDE WESEARCH . ENGINEERING . EQUIPMENT

THE BORR COMPANY - ENGINEERS - STAMFORD, CORN Associated Companies and Representatives in the principal cities of the world



"Whatever Your Conveyor Belting Problem . . . Thermoid Has The Answer"

Whatever the Job—whatever the nature of the materials to be handled—heavy or light, soft or abrasive, hot or cold, wet or dry, uniform or non-uniform in size—there is a Thermoid belt built to do the job at the lowest cost per ton of material handled.

Thermoid belts are made with an extra margin of endurance. You will find they stay on the job long after ordinary belts fail. With Thermoid, you will have fewer delays due to belt breakage or premature wear. Your Thermoid distributor will be glad to help you with your requirements.

Here's The Book That Will Answer Many Of Your Questions

Drop us a line for your free copy of Book No. 3679. It is a handy reference guide, concise and complete. 16 pages of valuable charts, tables and graphs tell how to select the right conveyor or elevator belt for the materials to be handled... how to determine capacities, speeds, weights and rumber of olice.

Conveyor & Elevator Belting - Transmission Belting / H.P. & Multiple V-Belts - Wrapped & Nelded Hose



Invader Shoot Packings of Finding Estates Industrial Brake Linings and Friction Meterials

Thermoid Company · Offices & Factories: Trenton, N. J., Nephi, Utah



Why Make a Mystery of Wire Rope Costs?

Every once in a while we run across somebody who's hopelessly confused about his wire rope costs. Sure, his books show him the total he spends each year—so much for this brand, so much for that brand, so much for a third. But he never really knows what he's getting from each brand in terms of work.

And work is what he buys with every cent he spends on rope. Work determines the cost—the actual cost.

LET YOUR RECORDS



He could easily clear things up by recording what each rope does . . . in terms of ton-miles, cubic yards of rock moved, or other simple, appropriate units. That would give him a basis for actual comparisons of costs and actual comparisons of brands.

Bethlehem has long recommended such a system, and more and more customers are using it. They have found it well worth the minor effort involved, for it's done away with guessing. They've found, too, in keeping such records, that every dollar spent on Bethlehem rope buys a mighty big dollar's worth of service.

BETHLEHEM STEEL COMPANY BETHLEHEM, PA.

On the Pucific Coast Bethielem products are sold by Bethielem Pacific Coast Steel Corporation Expert Distributer: Bethielem Steel Expert Corporation



The Lorado Coal Mining Company

LORADO, LOGAN CO., W. VA. March 27, 1951

Read it weep, Boys!

Joy Manufacturing Company, Henry W. Oliver Building, Pittsburgh 22, Pennsylvania

For a period of ten months we have used Joy Sulmet SF bits in a For a period of ten months we have used Joy Suimet SF olts in a universal cutting machine at our No. 5 Mine, Saunders, West Virginia.

These bits were in operation from February 1st to December 2nd, 1950. None of the bits was reground in that time, during which they cut approximately 54,000 tons of coal. This gave us a total bit cost, approximately 54,000 tons of coal. We estimate that these bits can be reground at least four times.

We certainly are satisfied with the results we are obtaining with Joy

Very truly yours, Lorado Coal Mining Company

L. F. Workman, General Manager of Mines

LPW:tmm

Sulmet bits.

WE NEVER EVEN DREAMED OF PERFORMANCE LIKE THAT

FROM

BUT, THE BIG POINT IS - THEY DID IT!

And-while we wouldn't promise such phenomenal results as those above-if you are looking for fast cutting, long bit life, and lower bit costs per ton, you'll find what you want in JOY SULMET TUNGSTEN CARBIDE BITS for cutters and coal drills.

WRITE FOR BULLETINS, or

GENERAL OFFICES: HENRY W. OLIVER BUILDING PITTSBURGH 22, PA.

IN CANADA JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Illustration shows a 200-ft, coil of 2" pipe. Approximate weight, 90 lbs.

YARDLEY M-1 PLASTIC PIPE

End corresion troubles for good. Use this tested plastic pipe that is resistant to acids and alkali. It is light, flexible and tough . . . withstands normal operating pressures and temperatures . . . cuts installation costs up to 60% . . . requires minimum maintenance.

Yardley M-1 pipe comes ready to use with accessories illustrated. Steeve-type outside couplings quickly attached with stainless steel clamps. Warehouse stocks near most mining

Made in 9 sizes...

Plastic M-1 pipe comes in standard iron pipe sizes: $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{4}$, \frac 4" and 6" in straight lengths.

Write us for nearest distributor.



INSERT COUPLING



INSERT ADAPTER





RDLE ADams 9315

Columbus 15, Ohio

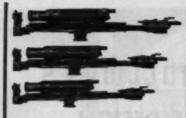


Other Yardiey Plastic Pipe >

A heavy-duty flexible A light-wall, rigid plastic pipe similar to M-1 for pipe with coment-type high-pressure, section firthings and thread and pumping applica-adapter.

Similar to M-3









between drill



and a complete line of offset stopers with 36-inch steel changes for deep holes, or with short feeds for confined spaces.

It's Le Roi-CLEVELAND

Rock Drills You Can Count On



The femous





CLEVELAND ROCK DRILL DIVISION

12500 Berea Road, Cleveland 11, Ohio

Why ROLLWRY'S

RIGHT ANGLE DESIGN

Steps Up Performance...
...Keeps Down Costs

Bearing life and performance are stepped up and kept up, maintenance and replacement costs drop, because of the *inbuilt* trueness of Rollway's right angle design. This basic precision principle greatly reduces sliding friction, end-rub, side-shock of the rollers. It balances the internal forces within each bearing, and promotes true rotation of the rollers around the shaft.

ROLL the RIGHT Way with ROLLWRY



in thrust bearings, too,

Honey thrust loads are carried best when the bearing is landed at right emple to the roller corrects. This feature of Boltway Thrust Boarings of Minimum communication and emplectual stress—promotes high a hillness and feature life.



Let's examine the bearing problems together to give you exactly the bearings you need. Our years of specialized bearing experience, plus complete engineering and metallurgical services are always available. No cost—no obligation. Just write or wire ROLLWAY BEARING CO., INC., SYRACUSE, N. Y.

ROLLWAY BEARINGS

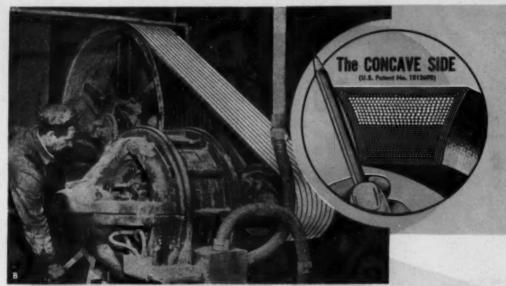
Complete Line of Radial and Thrust Cylindrical Roller Bearings

SALES Syracuse
OFFICES: Chicago

Beston Clevels

Philadelphia

Pittsburgh Detri



This 36"x 42" jaw crusher of Canadian Quarries, Ltd., Montreal, Quebec, used to be driven by a double reduction flat belt drive. Mr. Pierre Manasau, Master Machaelic, says that the Gates Volco Rope Drive shown, "has reduced our maintenance costs by about \$1000 per year and we were also able to increase production by fifty tans per hour."

This test shows how the Concave Side gives you a real saving in V-Belt costs

If you are interested in lower operating costs, make this simple test:—

Take any V-belt and bend it as it bends in going around a pulley. As the belt bends, grip its sides with your fingers and thumb. You will feel the sides of the belt bulge out!

This bulging gives a straight-sided V-belt the shape shown in figure 1-A. (See diagrams at right.) Clearly, this shape does not fit the sheave groove. The sides of the bulging belt are forced to press unevenly against the V-pulley—and this concentrates the wear along the middle of the sides.

But when you bend a V-belt that is built with the Concave Side, you find that the sides become perfectly straight—as shown in Figure 2-A. This shape precisely fits the sheave groove.

Because there is no bulging, the sides of the Gates Vulco Rope always grip the full face of the V-pulley What Happens When a V-Belt Bends

V-Belt Fo



Fq. 2

Cotos Vuico Rope with



Fig 2A

Haw Straight-Sided V-Ball Bulges in Sharre-Graeve. Sides Frees Unevenly Against V-Pulley Coursing Extra Wear At Paint Shawn by Account. The Cancere Sides PHI Out to a Fracise PH in, the Shoere Greere, No Side Bulget Sides Press Evenly Against the V-Pulley - Universe Wear - Langer Idea

evenly and therefore wear uniformly—resulting in longer belt life and lower belt costs for you.

Only V-belts made by Gates are built with concave sides. Whenever you buy V-belts, be sure you get the V-belt with the Concave Sides—The Gates Vulco Rope!

CS-514



ROPE DRIVES

THE GATES RUBBER COMPANY

DENVER, U. S. A

The World's targest Makers of V Belts





CALL THE TRANSMISSIONEER, your I



- positioning, removal insure better conveyors at less cost.
- Accurately formed. Uniform rim thickness. Fully enclosed - to exclude dust, dirt, water.
- Diameters 6 in. to 8 ft., all face widths. Popular sizes stocked by our distributors.

DODGE MANUFACTURING CORPORATION 3000 Union Street, Mishawaka, Indiana













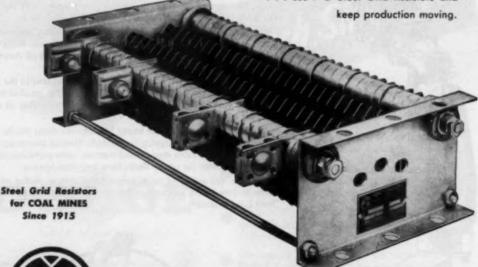
Resistor FAILURES COST MONEY

LOST MACHINE TIME ... DAMAGE TO MOTORS ... DAMAGE TO CONTROLS... COST OF NEW RESISTORS...

P-G Steel Grid Resistors REDUCE THIS COST ...

Steel and mica construction with provision for expansion, enable P-G Resistors to withstand many factors frequently causing resistor failure. By fewer failures, P-G Resistors minimize the effect of lost machine time and expensive electrical maintenance. Be protected

. . . use P-G Steel Grid Resistors and





THE POST-GLOVER ELECTRIC COMPANY

221 WEST THIRD STREET, CINCINNATI 2, OHIO



Mining Tires exactly fitted for their work

When we say "exactly fitted" we mean a mining tire built for the toughest conditions OFF THE ROAD, while giving a smooth long-wearing roll on the highway.

This off-the-road and on-the-road problem has now been solved. Both mining requirements have been fully met and mastered.

These are the facts about the U.S. ROYAL FLEET-MASTER which can contribute to a radical reduction in your tire costs.

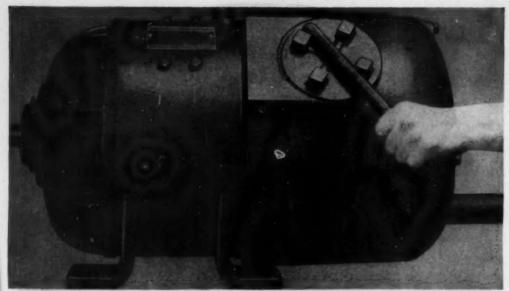
- 70% Deeper Traction Tread! (For complete holding penetration OFF THE ROAD! With long-wearing smoothness on the highway)
- ★ Tougher, Stronger Carcass! (Permitting even greater additional safe mileage with more recaps)
- Special Tread Compounds! (Utmost in cut and chip resistance)
- * Round-Moulded Carcass! (Natural inflated shape reduces distortion strain)
- ★ Thicker Under-Tread! (Your bed-rock for supertraction and mileage)

These U.S. Royal Fleetmaster facts aid up to reduced tire costs - increased efficiency - lower maintenance!

A phone call does it! To your nearest U. S. Rayal Distributor! He's listed in the Classified Telephone Book!

UNITED STATES RUBBER COMPANY

COAL AGE . June, 1951



1 Unscrew hand-hole covers. These one-piese covers, easily acrewed in or out without disturbing the fan housing, need no special tools for removal, have sturdy logs not readily domeged by hammer blows.



Remove hand-hale covers. They're made of cost bronze to resist corrosion and selzing of threads. Unique in design, key let ventilating air wips the entire surface of frame and and shield to assure adequate cooling. Cost-iron housing has grid to prevent contact with cooling ton by miners' fingers.



3 Inspect the brushes. There's wide-open accessibility to commutator and brush rigging. Screws connecting brush than lead to brush holder are easy to reach. Steel brush-holder yake wan't chip or crack if brush rigging is excessively fightened.

Easier to inspect -right on your mining machine!

New G-E mine motor brings all brushes within quick and easy reach, simplifies maintenance!

Now—with the new General Electric d-c mine motor—brush maintenance need no longer be a matter of taking the motor off the machine or working in hard-to-get-to areas. An innovation in mine motor design—two stud brush construction—permits locating all brushes on only one half of the commutator, directly under two large hand-holes, for easy accessibility.

And that's only one of 21 big features that add up to much easier maintenance, longer motor life, and easier installation. Full information on these new G-E motors—in ratings from ½ to 50 hp—is contained in Bulletin GEA-5553. For your copy, ask your G-E representative, or write Dept. 663-16, General Electric Company, Schenectady 5, N. Y.



GENERAL 🚳 ELECTRIC



U·S·S COR-TEN



COR-TEN CARS REQUIRE

Out-of-service time for major repairs is greatly reduced because of Cor-Ten's proved ability to stand up under conditions that shorten the life of ordinary, less rugged construction. It's a fact: More nary, less rugged construction as have been in use than five thousand Cor-Ten cars have been in use for over ten years, yet we have never heard of a single failure due to wear. A total of more than 26,000 mine cars has been built with U-S-S Cor-Ten.

U-S-S COR-TEN is a versatile steel. It is readily fabricated by all the usual shop methods and, in addition, lends itself well to whatever variations in design and dimensions are necessary to meet local operating conditions and users' preferences.

Write to our nearest office and get complete information on the important, money-saving advantages that Con-TEN offers the mining industry.



COR-TEN CARS LAST LONGER

U-S-S Cor-Ten, in thicknesses commonly used for mine car construction, has a minimum yield point of 50,000 pounds per square inch—1½ times that of carbon steel. Its resistance to abrasion is greater. Its endurance limit is 60% higher. It has 4 to 6 times the resistance to atmospheric corrosion of plain steel. These superior properties pay big dividends... particularly in mines where corrosive conditions are severe, or where cars are exposed to the heavy duty of modern mechanized operations.



COR-TEN CARS GIVE YOU LARGEST CAPACITY WITH LEAST WEIGHT

Authorities agree that big cars which permit full utilization of loading machine capacity—that reduce the number of trips necessary—and that save lubricants, repairs and man-power, are definite aids to greater efficiency and lower costs. For such cars, U.S.S Cor. Ten is the ideal costs. For such cars, U.S.S Cor. Ten is the ideal material. Its superior strength and durability permit construction that offers maximum capacity and maximum ruggedness at a minimum of weight for any given over-all dimension.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND - COLUMNIA STEEL COMPANY, SAN PRANCISCO

MATIGNAL TUBE COMPANY, PITTSBURGH - TERMESSEE COAL, IRON & RAILROAD COMPANY, BERRINGRAM - UNITED STATES STEEL COMPANY, PITTSBURGH UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST - BHITED STATES STEEL EXPORT COMPANY, WEREHOUSE DISTRIBUTORS, COAST-TO-COAST - BHITED STATES STEEL EXPORT COMPANY, WEREHOUSE DISTRIBUTORS, COAST-TO-COAST

USS

U·S·S HIGH STRENGTH STEELS

U-S-S COR-TEN . U-S-S MAN-TEN . U-S-S TRI-TEN

0-1394

UNITED STATES STEEL



We Broke the Law*

Crushed wet rock at Henry J. Kaiser's Radum Plant near Pleasanton, California, just naturally wanted to roll downhill. This presented a serious obstacle to the plans of Kaiser engineers, who were trying to increase tonnage at the sizing screens without the expense of installing an elevator system to lift this extremely wet and muddy rock. Outlining their problem to the Gilmore Steel & Supply Company representative, the Kaiser men were introduced to the use of Boston Woven Hose & Rubber Company's Bull Dog Herringbone Conveyor Belting. This belt, shown here, features a unique top cover of molded chevron designed rubber

steps for uphill conveying and provides efficient drainage of water and mud from the belt surface.

Now in service only a little over 16 months, the BWH belt has already established a record of high tonnage at low cost.

If your application calls for a special construction, let us demonstrate how dependable BWH products can help boost your production and profits, while lowering your costs.

*We refer, of course, to Hewton's law of gravity.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

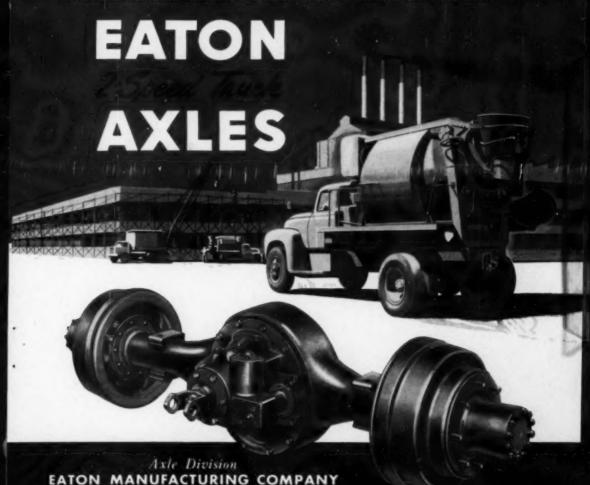
PLANT: CAMBRIDGE, MASS. . P. O. BOX 1071, BOSTON 3, MASS., U. S. A.



Speed is essential if trucks are to make deliveries on time. But speed alone won't do the job. Power is also necessary to prevent delays in getting away under full loads, climbing grades, pulling out of tough spots.

Eaton 2-Speed Axles provide drivers with both speed and power. This is made possible by the two gear ratios which Eaton provides for every conventional one. From "low low" to "high high" the Eaton driver can quickly find the most efficient gear ratio to deliver pulling power when needed, speed when desired. The result is faster running time.

And, exclusive Eaton features assure longer axle life. Your truck dealer will gladly explain Eaton's planetary gearing, positive lubrication, and other outstanding features.



PRODUCTS SODIUM COCIED POPPET, ANLI EREE VALVES « TAPPETS » HYDRAULIC VALVE LIFTERS » VALVE SEAT INSERTS » JET ENGINE PARTS » ROTOR PUMES » MOTOR TRUCK ASLES » PERMANERT MOLD GRAY IRON CASTINGS », HEATER-DEPROSTER UNITS » SHAP RINGS SPRINGTITES » SPRING WASHERS » COLD DRAWN STEEL » STAMPINGS » LEAF AND COIL SPRINGS » DYNAMATIC DRIVES BRAKES, DYNAMOMETERS

CLEVELAND, OHIO





Keeps speed reducers geared to greater tonnage . . .

A MIDWEST SURFACE MINE has processed an average of some 4,000 tons of coal per day in its large preparation plant. The continuous high output of this plant has been largely a result of decisions made two years ago by officials of this mine.

At that time, the preparation plant was put into operation. One of the decisions made by the mine operators was based on the recommendation of a Standard Oil lubrication specialist. The operators gave STANOIL Industrial Oil the important job of lubricating gear reduction units used in driving the processing equipment.

In the two years of operation, no cleaning of the reduction units has been necessary. Although changed each year as a matter of routine, STANOIL has shown no deterioration in service. Gear teeth have remained in excellent condition. Moreover, plant operators report that with the use of STANOIL there have been no heavy starting loads due to the oil's thickening at low temperatures.

STANOIL Industrial Oil

You can simplify your mine lubrication jobs by using STANOIL Industrial Oil. It provides cleaner operation of loader and crane hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems.

To assure you of maximum benefits from STANOIL and other high-quality petroleum products, the Standard Oil Company has a well-trained and experienced lubrication specialist near your plant. To obtain his prompt and expert services phone your local Standard Oil Company (Indiana) office, or write to: Standard Oil Company (Indiana), 910 S. Michigan Avenue, Chicago 80, Illinois.

What's YOUR problem?



Fred A. Barnes is the lubrication specialist who advised this midwest mine to use STANOIL in its speed reducers to safeguard gear teeth. With headquarters in Standard Oil's Decatur office, he was able to give prompt attention to the problem posed by the mine operators.

There's a Standard Oil lubrication specialist located near your mine. He's one of a corps of highly trained, experienced men throughout the midwest, and he's ready to help you make significant savings.

Arrange now for the visit of the lubrication specialist serving your area. Just phone or address a card to the nearest Standard Oil Company (Indiana) office. Ask him to explain the advantages of these other Standard petroleum products:

SUPERLA Mine Lubricants.—These new, improved oils and greases provide better lubrication of cutters, load-ers, locomotives, mine cars, and other underground equipment. They eliminate transmission-case deposits, reduce clutch-plate gumming, and minimize wear on gears and bearings.

CALUMET Viscous Inhericants—On open gears and wire rope, these greases resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

SUPERIA Granus. Available in lime soap and soda types, SUPERIA Greases cover a wide range of applications. These products are comparable in quality to the highest type of special greases but are as readily available and economical as ordinary oup greases.

STANDARD OIL COMPANY (INDIANA)



We Engineered this Man-Trip Car Into One Compact, All-Steel Unit For Safety, Comfort, and Low Cost!



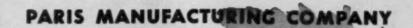
From the wheels up, this Sanford-Day Man-Trip Car has been built into one solid, all-steel unit for maximum strength and safety at low cost. Note that individual seats are an integral part of frame work and designed for maximum comfort. Result: minimum production cost which means you pay less. Note further that Sanford-Day's Man-Trip Car has no costly streamlined construction. More savings passed along to you. Safety at low cost has been the important factor. Note also that the top of the car is completely covered with high grade insulation for trolley wire protection.

Nothing has been overlooked to make this Sanford-Day Man-Trip Car your best possible buy for safe and efficient personnel transportation! For complete information write us today. Sanford-Day Iron Works, Knoxville 9, Tenn.



Close up view in circle above shows the roomy, safe seats with ample space for each man. Each car carries twenty-four men comfortably. This car measures approximately 6 ft. wide by 16 ft. long by 40 in. high.

SANFORD-DAY IRON WORKS



THREE NEW DRILLS

The PARMANCO Coal Drill will drill 25% inch holes at a seed of up to the feet per minute in #5 coal. Equipped the heavy duty truck-type transmission and fear end and a complete hydraulic feed, the drill is operated by one man from the control seat. It is made in two sizes with a 12 h.p. or 25 h.p. gas motor and all units are completely self-contained and enclosed in oil-tight cases.

ALREADY USED by

Big Band Califorias Ins.

Usilad Electris Coni Ca.

Fairwing Collectos Carp.

Colonial Cont Ca.

Little Sister Coni Ca.

Humo-Sinclair Cont Missing Ca.

Sibarwan-Yamatship Cont Ca.

Seathwattern III. Coal Sa.

Yrunx Fraer Gool Company.

Refractory Flaid

Harbin a-Walker Refractories Co.

Mexico, Refractories Co.

THIS UNIT IS DELIVERING 6-INCH SHOT HOLES — READY FOR LOADING at Better Than Two Feet a Minute I I I

The new PARMANCO Hi-Speed Horisontal Drill is completely redesigned around a 40 h.p. engine with four drilling speeds which, in field tests, has cut one-third off the footage drilling time—a cost-per-drilling-foot saving that we are passing on to the strip mine operator and contractor at no increase in our price. In addition the drill is equipped with a starter and generator, dual type front wheels, truck type rear axle with mechanical brakes and a traction drive with both forward and reverse.



Tuffy

FLEXIBLE

and Easy to Handle

When of the finest steel in a construction designed for universal designed sorvice give Tuffy drugfines the entre flexibility wouldn't without specificing other qualities, it's easy to hendle becourse it's pliable. Tuffy drugfines speel fetter and ride better on grouves. M's TOUGH

to Withstand Abrasive Wear

Maximum abrashe resistance is obtained by finer technic in construction of Tuffy Draglines. Materials used in these quality draglines are toughened to withstand more abrashe wear.

HUGS DRUM

When Casting

Jerking, pulling and bending stresses do not distort the pliable construction of Tuffy Draglines. They are engineered with stars toughness to withstand stresses—and to hold securely to drum when casting.



union Vire Rope

SPECIALISTS IN WIDE BORE

These Tuffys Are Also Specially



Tuffy Slusher Rope

sistence to abrazion . . . is rigid, non-collapsing to eliminate drom creshing, yet elastic and flexible enough to take up shock loads.



Tuffy Mining Team

Mining Machine Ropes, Crab Moles Ropes, Winch Ropes — all Union-Formed (Preformed) and designed in give maximum safety and service —at altinuate law cost.



STANDS UP

Under Severe Operating Stresses

Operating in dry dirt, wet dirt, sand, types of equipment. Tuffy Draglines wand up under more days of service and move for more yardage than the EASY

As 1-2-3 To Order

ONE-Dismeter, TWO-Longth, THREE—the name "Tuffy" That's all the Information you need to order THIS GIANT MACHINE TURNS OUT 27 TONS UNION WIRE ROPE ONE CONTINUOUS LENGTH



It stands 4 stories high . . . has cap far laying rope from %" to 4" in diam This messive scholing machine typifies modern equipment used in Union Rapa's plant to produce Tuffy Dragi hoom rapes. home

Designed for Specialized Mining Uses



Tuffy Slings

Send For These Folders Today

See how you can cut operating costs reduce downtime gain longer, better performance with Tuffy Wire Ropes for mining. Mail coupon today.

UNION WIRE ROPE CORPORATION

Specialists in Wire Rope Kansas City 3, Mo. 2130 Monchester Ave.

Please send me illustrated falder on:

Tuffy Slusher Rapes

☐ Tuffy Mining Machine Ropes ☐ Tuffy Slings ☐ Tuffy Draglines

Firm Name

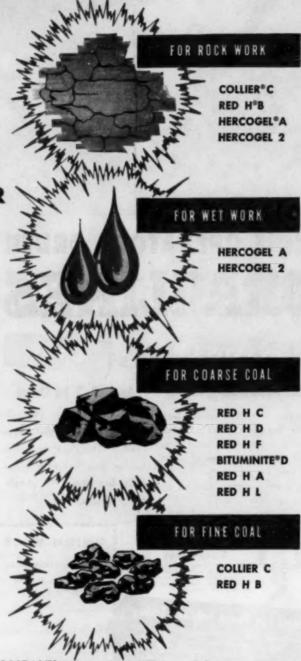
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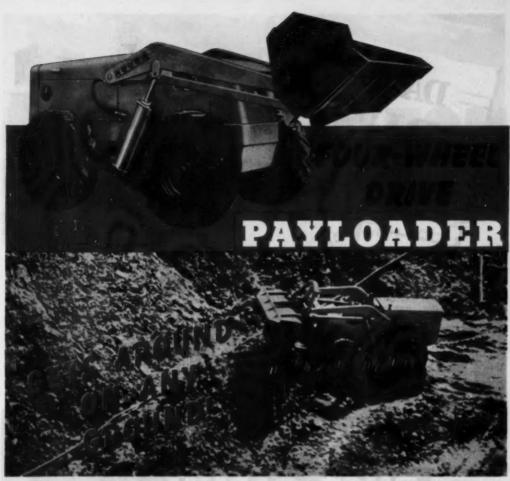
_State.

Permissibles

THAT GIVE
THE MOST
FOR YOUR
DYNAMITE
DOLLAR

One of the permissibles on the Hercules list will shoot your coal the way you want it, and make every dollar you spend for explosives go further. Let Hercules help you to select the permissibles best suited to your coal and working conditions.





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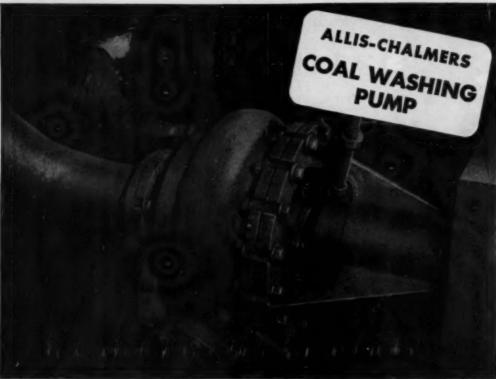
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COAL AGE . June. 1851

81



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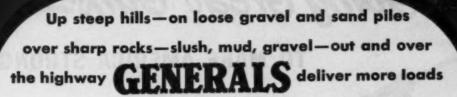
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June, 1851 . COAL AGE



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A DEPARTMENT OF NATIONAL COAL ASSOCIATION WASHINGTON, D. C.

FOR NATIONAL DEFENSE FOR PEACETIME PROGRESS



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JUNE, 1951

IVAN A. GIVEN, EDITOR

Cashing in at Home

DO COAL COMPANIES get the credit they deserve for what they do to benefit the community? The record shows that many mining organizations work hard to make their communities better places to live and their mines more-efficient, safer and more-comfortable places to work, with the employees' security and future assured by heavy capital investmenta. Yet the same record shows that so far these achievements seldom come to the attention of employees and the public in the mining areas.

Fostering a favorable "grassroots opinion" among the millions living in the mining areas is a major step toward better public understanding of coal throughout the Nation. Consider, for example, the benefits of such favorable publicity as the newspaper editorial in the feature elsewhere in this issue describing the gob-fire control plan of the Christopher Coal Co., especially if an atmosphere is created where, as in this instance, the testimonials are unsolicited.

Management has a lot to gain by grassroots public relations. Local or regional publications always welcome "a story," on a new development, a new production or safety record, or a human interest item built around some employee achievement on the job or elsewhere, and getting the facts published fully and accurately is a great goodwill builder. The columns of Coal Age, incidentally, also are open to such news developments. Consequently, management has the double-pronged opportunity of furthering the industry's overall objective while carrying on much-needed spade work at home.

Key Cost Approach

SINCE COAL MINING is fundamentally a materials-handling job, that concept should be the key to production thinking. Coal itself is the basic material but is not the only one involved in mining.

Others are air, water, timber and so on. With these, as with coal, methods of utilizing manpower with the maximum efficiency lead to lowest cost.

Consider, for example, the difference in results with the well-trained compared to merely ordinary machine operators, maintenance men and other mine employees. It adds up to real money in a relatively short time. Thus, the need for training discussed in the feature beginning on the following page. Consider, also, the savings in labor and power resulting from aluminum pipe for drainage in low coal and sealing of roof and ribs with plastic film, as noted in features in this and the two preceding issues of Coal Age. All these show the advantages of seeking out new methods, new equipment and new materials for reducing the cost of the materials-handling job that is coal mining.

Tougher Going

TO THE COAL MAN struggling with the marketing problem that seems to confront the industry more often than not, it would seem at times that the tough going is reserved for him alone, while his competition—natural gas in particular—has nothing but smooth sailing. But, though gas still is a long way from getting into serious difficulties, signs are multiplying that the going will be tougher.

The cost of gas and of its distribution, for instance, are going up—slowly, but still up. Also, the problem of meeting peak winter demands is a long way from being solved. In addition, as a series of articles starting in the New York Times of May 10, indicates, the public is beginning to be concerned about gas-line safety, with the prospect that much-stiffer regulation, with attendant cost increases, is not too far in the future. It is, of course, too much to expect that gas expansion can be arrested overnight, but there is, as noted, good evidence that it will face tougher going, with corresponding improvement in coal's position, particularly if it keeps the pressure on.



OUTDOOR PRACTICE—Former brakemen and new operators learn to handle shuttle cars on a surface course, where there are no timbers to knock down. This assures safer work and higher efficiency when the men go into the mine.

Training for Better Mining

How Your Own Training Plan Can

Improve Machine Operation Save Your Company Money Strengthen National Defense

How a Technical Institute Can

Upgrade Maintenance and Repair Elevate Workers' Skills Develop Standard Practices

HOW MUCH MONEY could you save your company if you could put a stop to breakdowns and outages that happen because somebody is careless with equipment or doesn't know how to operate mining machines?

How much better would your company do if your workers were trained to get out more coal with their machines and keep them running all through the shift?

How much more coal could you provide to fuel the Nation's defense if those men and machines worked all day at top efficiency? Scanning a series of daily operating reports not long ago, the production engineer of a big coalmining outfit with several mechanized mines estimated that his

company was losing \$3,500 per day in unmined coal as a result of equipment breakdowns and outages alone. This adds up fast, he explained—\$100,000 in only 29 working days.

The basis of his estimate was an average loss of 12 min per unitshift, a unit-shift being the men and equipment needed to handle the output of one loading machine or one continuous miner. On three shifts per day, the company operates 140 unit-shifts. Average production per unit-shift is 150 tons in 6 hr of actual working time. That's 25 tph, or 5 tons every 12 min. Translated into dollars, with coal bringing \$5 per ton at the mine, it adds up to \$25 worth of lost production per unit-shift. Mul-

tiply that by 140 unit-shifts, and you get \$3,500 per day or, in round figures, \$100,000 in 29 days.

That, to repeat, is tonnage lost because of mechanical and electrical outages that result mostly from faulty corrective or preventive maintenance. It doesn't take into account the substantial bonus tonnage men could produce if they were fully trained to get the best out of their machines while they're running.

The fact is, putting machines into the mine is only half of the job of mechanising. The other half is training men to use the machines. If the skills of your men don't match the built-in efficiency of your equipment, you won't recover your investment in machines



UNDERGROUND REPAIR—A cutting-machine breakdown semetimes requires on the spot repairs. Well-trained repairmen return the machine in minimum time.

very fast and you might almost as well go back to high-cost handloading. Besides, in these strenuous times, an untrained worker is an obstacle to full production for national defense.

Problems and Methods

Who should be trained, and how much training should you provide? What kind of training program or school should you set up?

What should you teach your workers?

What are the problems you'll have to solve and the rewards you'll earn?

Coal mining is an ever-advancing industry. In the last 15 to 20 yr, machines have replaced picks and shovels and taken over cutting, drilling and loading. Underground transportation has become swift and complex. Roof bolts, installed with power drills and tightened with power wrenches, are replacing wood and steel timbers. In growing numbers, continuous miners are tearing coal directly off the face. And new preparation-plant methods-heavy-media treatment of fines, for instance-are making coal cleaning a trained technician's job.

Each of these advances toward complete machine mining elevates the level of skills needed in modern mining. To mine coal the modern way, it's not enough to give your worker—new man, or old man being switched to a new job—a talk with the superintendent or foreman, a quick run-through of his new task, and then turn him loose to make his own way. If you leave training at that, you won't get your money's worth out of your new machines and your safety record, unless you're luckier than most operators, will suffer.

Your need for general and specific skills will be one factor in determining how many men you'll train—and how. You can catalog the skills you need to keep your mine running at top efficiency the same way you calculate your needs for steel, cable and mine cars. Your needs will vary with the quantity of coal you expect to mine and the kind of operation you run—whether deep or strip, thickseam or thin, flat or pitching, track or trackless.

You know you'll need so many machinists, so many motormen, so many "cat skinners," so many machine operators, so many electricians and so many timbermen or roof-bolters. Also, you'll have cable to splice, hydraulic repairs to make, forge and lathe work to do, armatures to rewind and internal-combustion engines to maintain and overhaul. You'll need other skills, too, to run your mine. These skills will require more or

less training depending upon the complexity of certain jobs and the aptitude and interest of the workers you send through the course.

The number of skills you expect each man to acquire will be another factor in determining how many men you'll train and how much time you'll set up for their schooling. If your mine is small, you'll probably train fewer men but you'll train them in a wider range of skills. If you operate a big mine, or several mines, you'll train more men and you'll probably want to make specialists of moat.

The kind of training course you provide will vary with your ability to support a program and, perhaps, your nearness to other operators, like you, are concerned about the need for skilled men.

If your company is a big one you doubtless can organize, finance and operate a training set-up on your own. Your training program will break in your new men, update your old hands and provide you with a reservoir of skilled and semi-skilled men for upgrading to foremen.

Your safety director, personnel manager or training director will run your school, conferring with operating and engineering experts on what to teach, You'll make rooms available for lectures, conferences, discussions and visual aids, and you'll recruit instructors within your company, from nearby high schools and from federal and state agencies. You'll make shop space and shop equipment available and you'll provide mining machinery and equipment for practical instruction in maintenance and repair.

You might even go further by providing a training section in one of your mines where new men, under close supervision and instruction, can get the feel of underground work, practice on the machines they'll work with and see first-hand what the hazards of mining are. This training section in your mine also would give your old hands a place to warm up on newtype machines and equipment, perhaps under supervision of a manufacturer's representative.

Too costly and too big—that may be the way you feel about the kind of training plan outlined above. Even so, you can do one thing Hanna in Ohio and some operators in southern West Virginia, western Pennsylvania and the anthracite region are doing. They're helping organize coal-mining classes

How Training Can Be Organized and What It Offers

in local high schools and vocational schools (Coal Age, October, 1947). That way, they interest youngsters of high-school age and teach them the basic facts about methods and machines for safe, efficient mining. The operators provide demonstration materials, such as, cap lamps, anemometers, safety lamps and mine maps; arrange for students and instructors to tour the mines from time to time; and encourage the instructors to broaden their knowledge of the industry's needs, its methods and its equipment and keep abreast of its

You also can do what Eastern Gas & Fuel Associates is doing in the schools near its mines in Pennsylvania, West Virginia and Kentucky — providing these schools with a steady flow of printed information about coal and the coal industry. This strengthens the company and the industry public relations-wise and makes it easier to recruit young men for mining.

Besides interesting and training high-school students, you can do a good deal to train your present workers to do a better job without organizing an all-out training program for them. At the Warwick mine, Duquesne Light Co., Greensboro, Pa., for instance, shuttle-car operators - experienced "buggy" men who are getting new-type shuttle cars as well as brakemen who are being switched to "buggies"-practice on their new machines for 6 or 8 hr above ground before they go inside with their new cars.

They practice on a surface course staked out and chalk-lined to duplicate the turns an operator must make underground. Operators of rubber-tired universal cutting machines, now being installed at Warwick, also practice tramming on the surface course. Both "buggy" men and cutting-machine operators back up and turn their machines under the watchful eye of the mine superintendent or safety director.

The pay-off: Fewer timbers knocked out and generally skillful maneuvering of machines underground.

At Duquesne's Harwick mine, Harwick, Pa., the safety director or the mine superintendent gives an entire day to every new worker, escorting him through the mine, introducing him to his fellow workers, explaining the work cycle and the machines he sees and pointing out underground hazards.

The pay-off: New men who un-

derstand the overall job of underground mining, want to work as part of a team and are alert.

At Rochester & Pittsburgh Coal Co., Indiana, Pa., officials built demonstration models of new-type mercury-switch control panels that were being installed on loading machines. Electrical mantenance men studied these models in the shop, learning likely trouble spots and repair procedures, Pittsburgh Coal Co., Library, Pa., as well as Rochester & Pittsburgh, provides a special training shop, with demonstration benches, to keep electrical and maintenance men abreast of new-fangled equipment, materials and methods.

The pay-off: Quicker diagnosis of equipment breakdowns underground, faster on-the-spot repairs and speedier return of disabled machines to work.

Another company, when it buys a new machine, tacks a notice on the bulletin board and puts the new machine on display in the

shop.

The pay-off: Better understanding of the why's of the company's capital investments and friendlier acceptance of new machines and equipment by the mine workers. Without help from anybody else and without any big outlay of money, these are a few of the training moves you can make on your own. If you do need help, some state mining departments will provide instructors, some state universities will provide extension courses, and the U. S. Bureau of Mines will work with you in first-aid and eafety training. The costs are negligible.

At reasonable cost to your men and you can make it easier on them by having your company shoulder part of the cost-they can sign up for correspondence courses offered by various institutions specializing in training by mail. International Correspondence Schools, Scranton, Pa., is one of several schools of this type. The Holmes Institute, Washington, D. C., with a group contract plan available to companies, is another. And if there's a general technical or vocational training school near your properties, easily reached by automobile and running on a schedule that permits off-shift schooling, you can encourage your better men to enroll.

Proposed: A Technical Institute

A regional technical institute specializing in coal mining, sponsored by a number of operators or an operators' association, to provide training for mechanics, electricians, maintenance men and machine operators—that's the brightest and freshest idea in coal-mining training in a good while. It's now gaining favor in some quarters of the industry.

A pattern for what might be done along this line now exists, among other places, at Pikeville, Ky., and Blairsville, Pa. At Blairsville, a group of interested coal men recently made an exploratory visit to Vale Technical Institute. There, more than 500 Air Force trainees are being schooled in automotive maintenance. When they finish the course, these trainees will become vehicle operators and will be responsible for maintaining their own vehicles and others.

How would this plan work in schooling better men for coal min-

Financial and moral support from several coal companies in an area, possibly through their association, would be needed to get a coal-mining technical institute going. It could be operated directly by the association or by contract with an experienced director or manager. The school would be centrally located to draw students from many coal companies.

Adequate floor space in a building capable of carrying heavy machines would be required, as well as living and dining quarters for students and staff. Somebody—probably the coal companies themselves—would have to provide machine tools and shop equipment. Also somebody—either the association members or machinery manufacturers—would have to provide equipment for practical demonstration of operating practices, maintenance methods, repair, dismantling and reassembly.

Instructors, besides the attributes of leadership, patience and understanding characteristic of good teachers, would need to be experts in their fields and, in addition to technical skills, would need some experience in coal mining or preparation. These men, of course, are the very kind the industry now needs for its operations and, in

that sense, the industry would be competing against itself in seeking a staff for the school. In the long run, however, instructors would train more men like themselves. Thus a company that surrendered a master mechanic to the faculty of a technical school eventually would get back half a dozen or more skilled or semi-skilled maintenance men. That would be a pretty good deal.

The courses would be designed to fit various needs, somewhat as

follows:

A major 6-mo course for full training as a coal-mine mechanic or electrician

A mining-orientation course, say 2 wk long, for young men who are new to coal mining and who need to be broken in on the specific jobs they'll do. Later, after they've proved themselves, they might return to school for the 6-mo course.

An up-dating course, say 1 wk long, for experienced workers who need an introduction to new-type machines and equipment or to new

methods.

An adapter course, maybe 3 wk long, for electricians and mechanics trained in other industries but new to coal and coal's needs.

An off-hours course, 2 to 3 hr per week for several weeks, for men who are within easy commuting distance of the school and prefer to keep working full-time during their training.

A series of one-shot courses for shop men who are skilled in some jobs but weak in others — cable splicing, for example, or tire maintenance and repair.

Subjects would include the following as a minimum:

Acetylene and electric welding. Forge work.

Blueprints, layout, shop mathematics and design.

Threading and fitting.

Pumps.

Electricity—Principles; AC and DC; motors; wiring and controls.

Shop work for mine and preparation-plant equipment—Mechanical principles; assembling; fitting and adjusting bearings; lubrication; hydraulic systems; testing and trouble-shooting; ordering repair parts; instrumentation.

Machine operation-Work methods and standard practices.

Careful screening of students would not be needed in the shorter courses. Nearly every worker, at one time or another, would go to school for a while.

For the major 6-mo course, however, students would be carefully selected on the basis of proved aptitude, interest and character. Young men already employed and high-school graduates from mining areas probably would be the lest prospects.

An outside agency could screen applicants and nominees by giving them standard tests for aptitude, dexterity and knowledge. On a less formal basis, individual operators or the sponsoring association could screen them. Nominations would come from coal-company officials and, perhaps, from local and district union officials. It should be possible also for an individual miner, on his own initiative, to request screening and training, provided he could obtain an endorsement from his superintendent or his local union.

Cost of a technical institute would be a considerable item, though it would be spread among several companies. Instructors' salaries at minimum would have to equal their possible earnings in industry. Housing for classrooms, shops and students' living quarters would cost money. Tools, shop equipment, teaching materials. electric service and general housekeeping and management expenses would add to the bill. Finally, students at the school would have to be subsidized by full or partial payment of wages, tuition fees and transportation costs during school-

Cutting the cost down to manageable size, however, would be possible. Manufacturers doubtless could be persuaded to move mining equipment and machines into the school for practical instruction in operation, maintenance and repair, and provide operating manuals, wiring diagrams and other visual aids for teaching. Federal aid from Smith-Hughes funds, as well as some state money, probably could be obtained.

A small training mine in connection with the technical institute, besides providing practical schooling in the operation of machinery and equipment, probably would help cut down the cost of training. Coal produced in the training mine could be marketed, like any other coal, through some sponsoring company or through the sponsoring association itself, with the proceeds being returned to the school treasury.

The union need not be an obstacle to your training plan, however big or modest it may be, if you make the right approach at the start; that is, take the union into your confidence at the beginning; work out a pattern that meets your needs without infringing on the union's area, violating the contract or upsetting the pay scale; and welcome the union's counsel on subject matter for courses, administration and selection of students.

Your approach to the union would be made at the local and district level if you set up your own company program. For something big, like the technical institute, the approach probably should include the union's international head-quarters in Washington, as well as local and district offices. The aim, of course, would be to obtain

union cooperation.
Your workers should not be overlooked when you start to harvest the rewards of your training program. They're entitled to a share of the gains, money-wise and morale-wise. They deserve upgrading as their performance improves as well as recognition for their achievements, with appropriate ceremonies, certificates, distinctive buttons and mention in the company magazine or newspaper.

The rewards of a training program for you and your company

gram for you and your company will be these:

1. Skilled operators who maneuter their machines efficiently, rec-

ver their machines efficiently, recognize the symptoms of trouble before their machines break down, and make the minor repairs and adjustments that otherwise would waste the time of a maintenance man, master mechanic or electrician.

Skilled maintenance men who know their equipment thoroughly, spot the source of trouble fast, and put machines back to work in the shortest possible time.

3. Development of standard operating practices and procedures that will get the most out of every machine, reduce down time and improve safety. Thus your men will be trained the way you want them trained, not the way some old hand wants his younger buddy trained.

 A backlog of skilled and semiskilled workers who can be upgraded to supervisory posts when you need them.

5. Lower costs per ton.

6. More tons of coal with the same number of men or fewer, thus, while protecting yourself against manpower shortages ahead, mining the coal the Nation needs for its defense effort.

[For executive comment on the proposed technical institute, see following page.]

The Executives' Forum

Training by Technical Institute

R. T. LAING, Exec. Director Central Pennsylvania Coal Producers' Association, Altoona, Pa.

THE ESTABLISHMENT of a regional technical school or institute, which has for its purpose the training, guidance and education in the operation, maintenance and repair of mining machinery, would be of great service and fill a very definite need in the bituminous coal-mining industry in Central Pennsylvania. Considerable thought has been given to this prospect by many operating companies, some coal associations, state and federal vocational and educational agencies and a few trade-school operators. There has been, however, very little action. The present trend toward complete mechanization is perhaps the spark

that is needed for realization. . . Lack of coordinated activity in the past has been due to many factors, among which were geographical location and absence of a common interest. The present mechanization program has solved the common-interest problem. The geographical-location problem has been reduced to a matter of selecting a site where physical assets are available in an area that will serve a large portion of the industry within a reasonable radius. A careful survey could establish present needs of the industry . . .

Careful planning and thought must be given to the curriculum, faculty, length of term and flexibility of the entire program. A compilation of data already collected by interested parties, together with a study of curricula and methods of correspondence—trade schools that are presently trying to meet our needs—would be a starting place. A survey of frequency of operation, repair and maintenance difficulties within the industry might indicate specific curriculum needs.

The school will be as good as its faculty. It will be important, therefore, to attract those instructors who are well trained in their particular fields without too much emphasis on formal education. The type of instruction probably will follow a unit plan, which of itself will regulate to a certain degree the length of the term. In other

words, a student will be able to select those units in which he wishes extensive instruction. The entire program will have to be built around student needs and made flexible to the extent that formality will not be too rigid and deny pupils a choice of interests.

Because most of the students will be employed personnel, all courses would of necessity be intensive rather than extensive . . .

The source, quality and supply of students must be given consideration. If the school is organized in a manner that will convince industry of its merits, the majority of students will come from that source. Men of promise who presently are taking on-the-job training or enrolled in extension or summer-school sessions for formal education naturally will be selected for the type of training offered . . many students will be boys who have finished formal education in public schools and have chosen some phase of mining as a career. With proper presentation of the opportunities existing in the mining industry today, we should be able to attract students with outstanding scholastic ability.

Another source of student supply originates from graduates from colleges in the fields of mining engineering or related curricula. A school of this nature will give those students an opportunity to become familiar with the complicated machinery that presently is being used in the industry . . .

All students should be carefully screened before enrollment. Aptitude and intelligence tests could well be used to determine interests and ability. To attract the interest of present employees, some type of incentive reward should be established.

Financial problems, although of great importance, will fade into insignificance once the program is justified. Any objections industry might have would disappear quickly when it is demonstrated that personnel trained in the school can keep machinery moving. Idle machinery is a most expensive item.

Naturally, industry will be called on to help finance the project. Judging from its activity in research programs, we are led to believe that industry will be a strong promoter of this type of project, both financially and morally. Equipment and mining-machine manufacturers, cleaning-plant constructors and haulage-equipment producers should be most eager to furnish equipment for instruction and experimentation. Instruction personnel might be recruited from this source.

It may be possible also to get financial aid from federal and state vocational agencies who are most anxious to help in any vocational-training program. Labor organizations will undoubtedly give whole-hearted support to any movement that has for its purpose the welfare of its members.

Finally, the student, who will be the chief benefactor, will be more than willing to assume his equitable share of the financial responsibility.

The movement for the establishment of a technical school is ripe. At a time when the industry is being plagued by a predominance of competitive fuels and extraneous factors that increase cost, we should be looking toward any program that will increase efficiency, contribute to the workers' welfare and produce a better product.

H. C. WOODS, Vice Chairman Sahara Coal Co. Chicago, III.

As you are aware, I am chairman of the Vocational and Educational Department of the National Coal Association, and this subject is presently on our agenda and was very thoroughly discussed at the recent meeting of our committee, which was held at the University of Illinois . . .

We are very much interested in the subject and are about to make a suggestion to the National Coal Association and to their operaors of starting a school for coal miners such as you suggest, somewhere in Western Pennsylvania as an experiment.

We believe it should be run by outside hands . . . We believe that from the United States we can get an enrollment of at least 150, who would make such a school profitable in itself. The coal industry could lend its help in suggesting the courses to be taught. The equipment industry already has informed us that they would be willing to furnish machinery.

We do not think that there is enough interest at the local state level to establish schools of this nature all over the United States. The outstanding job that has been done up to the present time is by the operators of West Virginia, aided by their state, in vocational training in local high schools...

The men sent to this school will be union miners. We do not think the unions will object but we must obtain their approval.

The financing problem must be solved by the coal operators who send their individual men.

R. W. BEAMER, Training Supervisor Rochester & Pittsburgh Coal Co. Indiana, Pa.

Today, there is not a good trade school available for mine maintenance workers . . The coal industry needs and should be able to support one good school such as proposed in this article.

A school such as you propose will require a great amount of building space for shop purposes -20,000 to 40,000 sq ft-plus the necessary equipment, tools, etc. This means a large investment and has prevented even the larger companies from developing a program of their own. Such facilities when established must be utilized to the maximum to keep costs reasonable. For this reason, it appears that we should concentrate on the establishment of one really good trade school for the coal-mining industry.

We have had inquiries from young men now in the industry as well as from high-school graduates who wanted to attend a trade or technical school which could train men on mine-equipment maintenance. The only technical- or trade-school training that we could suggest was the electrical trade achool. Too frequently, these schools stress radio, refrigeration, electronics, etc. . . .

Expensive equipment, maintenance under adverse conditions and loss due to excessive down time make good maintenance workers essential. It is difficult to see how a sufficient number of well-trained workers can be developed without the facilities and leadership that could be provided by a good mine-equipment trade school along the lines of your proposal.

HARRY LaVIERS, Vice President South-East Coal Co. Paintsville, Ky.

I unqualifiedly approve a program for establishing regional technical schools to train miners, maintenance and repairmen, and electricians. In fact, here in the Big Sandy district, we have already launched out on a project very much along the lines you have outlined to me, and while we do not have as broad a scope as you propose we hope to see it grow into as comprehensive a proposal as you suggest.

We have located here in Paintsville the Mayo State Vocational School, which is supported by the Commonwealth of Kentucky and which is offering courses in electrical maintenance repair, machinists, sheet-metal work, safety and commercial training. The curricula of this institution are sufficiently flexible to fit into any national program, and I am sure the director will be happy to cooperate in any movement of this sort.

There is one feature of this proposal that I would like to emphasize, and that is that any institution of this character should have an advisory board composed of representative operators, representatives of local labor organizations, and representatives of local machinery distributors who can assist in setting up a practical course of study.

The financing of the student's board and lodging while in school could be arranged providing there was some agreement whereby the sponsoring companies would be assured the services of the trained students for a limited period of time following their completion of the course of study.

F. J. FORESMAN Personnel Director Pittsburg & Midway Coal Mining Co. Pittsburg, Kan.

I certainly think your proposal has merit, especially in the East where mining is more concentrated. In this field we have not had much difficulty in obtaining competent, trained men. . . .

For those men in this district wishing to take training in welding, mechanics, machine work and other types of industrial arts, the Pittsburg State Teachers' College offers Smith-Hughes courses. At the present time, two of our men

are taking a course in welding.

If it could be arranged, I think the institute should have a course in economics so the men would have a better understanding of mutual problems and responsibilities of management and labor.

L. C. CAMPBELL Vice President, Coal Division Eastern Gas & Fuel Associates Pittsburgh, Pa.

Coal mining has always been fundamentally a material-moving job. The methods of material-moving have changed greatly since the first coal was mined and transported. These changes have been particularly great in recent years with the addition of so many mechanical tools to assist the miner in his job. He is still referred to as a miner, even though he is an operator of a locomotive, shuttle car, cutting machine, loading machine or other production tool.

These tremendous changes in machines and methods for handling the material of coal and the removal of necessary rock and similar deadwork material have marked the progress of mining just as surely as similar tremendous changes in the handling of material for highway, railroad grade and similar material have been marked by unbelievable changes in machines and methods.

In every case the introduction of this machinery has meant the training of operators and mechanics to keep the machines running on shift, and a specialized group of mechanics and repairmen to maintain and overhaul them at routine intervals. The day of the so-called "car knocker" went out with the introduction of large-capacity steel mine cars, and was supplanted by car-repair shops which, while smaller, are just as important to the transportation and haulage of a coal mine as the large-scale wellequipped steel car shops are to the transportation of our railroad lines. Similarly, the passing of hand loading-and, to a large extent, the hand tools of the old-time hand loader-is almost complete.

The introduction of training courses which will acquaint men with this new field of specialized employment and train them for it is an important step to the coalmining industry.



POWER DUCKBILLS load 40-ft rooms and advance 2,000 ft is a straight line. Crossbars and steel jacks at the face and wood posts outby now are being used after a trial preved roof-bolting to be more costly and of no advantage with this type of roof.





CONCRETE FOUNDATION for drive of 30-in No. I main belt is shown by Robert Reeves, day mine foremen. The 15-car trips are loaded and changed without stopping the conveyor, Carloading point (right) is 850 ft inby the haulage portel.

100 Tons Per Duckbill Shift in 38-In Coal Proves Workability of . . .

"Continuous-Face" Mining

MAINLY BY A CHANGE IN MINING PLAN—from 300- to 2,000-ft rooms—output per unit and per man over long periods, including moves, was increased more than one-third at the Reels Cove mine of the Tennessee Products & Chemical Corp., Whitwell, Tenn. In mining a panel, the new method, locally called "continuous face," eliminates the usual development period. Coal is loaded with power duckbills and is transported from the pan lines via

belt conveyors to mine cars, which are operated in trips of 15 each without uncoupling of the individual cars.

Reels Cove mine, now working 38-in coal of the Sewanee seam, originally was opened in 1944 with a large investment in equipment, including a conveyor system to carry coal down the mountainside from the seam elevation of 1,850 ft to the railroad tipple at 830-ft elevation (Coal Age., March, 1946). In 1948

three Goodman 277 power duckbills were installed to replace handloading onto shakers (Coal Age, May, 1949). Now, the mine is equipped with eight power duckbills and four more are on hand for installation at an early date. Top rock shot down on the tracked haulageway is loaded into mine cars with a Whaley No. 3 Automat.

While part of the Reels Cove production goes to steam and domestic markets, a large portion is captive

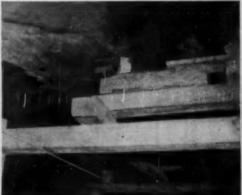


HYDRAULIC JACKS anchor the power duckbills. With the "continuous-face" system, the usual room development is avoided.



SHOVEL-ACTION TRACK-TYPE UNIT loads top rock shot down in 250-ft lifts in advancing main haulageway.





TYPICAL EXAMPLES of how the unusual top fell away from roof bolts after a year's service in haulageways, requiring their replacement with timber. Bolting performed satisfactorily in room work but proved costly in comparison with timbering.

Recis Cove Mining Plan Provides High Efficiency With 2,000-Ft Rooms

Here's How Changes in Methods Boosted Efficiency at Reels Cove Mine. For Example:

Changing From 300- to 2,000-Ft Rooms Eliminated Usual Development and Boosted Output per Faceman One-Third

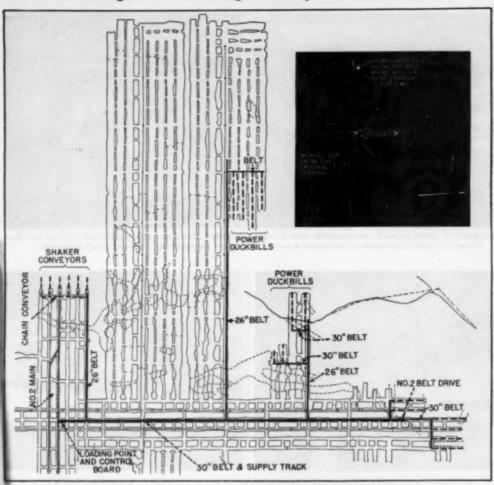
Double Gathering Belts Tested for Flexibility

"Continuous-Train" Carloading to Eliminate Spotting Delays Revised

Roof-Bolting Found Uneconomical Under Local
Roof Conditions

tonnage for the company's four principal plants, including the Semet-Solvay ovens in Chattanooga. Carl McFarlin, Nashville, president of the Tennessee Products & Chemical Corp. since 1939, is a mining engineer and pioneered coal washing in Tennessee when he installed, for the Black Diamond Coal Mining Co., a coal washer, including a table plant, at the old Whitwell mine. W. J. Travis is manager of coal operations and coal properties, and H. A. Daffron is superintendent of the Reels Cove mine. The operation produces 2,000 tpd and in 1950 mined 29% more coal than in the previous year, even with a substantial reduction in working force. Of the daily production, some 1,600 tons is duckbill-loaded while the

Reels Cove Mining Plan Provides High Efficiency With 2,000-Ft Rooms



HG. I.—ACTIVE AREA of Reels Cove No. 2 mine where power duckbills now drive 2,000-ft rooms. Now under test is the use of two wathering belts per four-room section, expected to provide more flexibility than the present practice of one cross-belt per section. Inset (top right) shows active area and adjacent projections in relation to the original portal (No. 1 mine) and dump hopper.

other 400 tons is loaded by hand onto shakers in development work.

• The mine roof consists of a shale ranging from a few inches to 50 ft thick and capped with a thick sandrock. Crossbars and screw jacks at the face, and small posts set behind, hold the roof without difficulty for the normal time required to work out a room, although in a year or so the slate disintegrates and breaks to its full thickness to entirely fill worked-out areas. This broken rock then helps to support the sandstone and other overburden. The seam is near the top of the mountain and total cover over the present workings varies from 100 to 300 ft. The bottom is a fireclay which softens considerably when wet, but little water has been encountered. No gas has been detected in the mine.

• With the new mining method, a 410x2,000-ft panel is mined by driving four parallel rooms 2,000 ft deep, and then turning the power duckbills around to work four additional rooms back to the main line. Rooms are 40 ft wide and the pillars 10 ft, except that on the advance a 30-ft pillar is left between Rooms 3 and 4 as protection for the 26-in section belt installed in Room 4 as it is advanced. The section belt is moved out as Rooms 5, 6, 7 and 8 are mined

on retreat back to the panel belt.

Shaker conveyors in the four rooms deliver to a 30-in cross belt 200 ft long which, in turn, discharges to the section belt. Once the power duckbills have advanced 250 ft, the cross-belt conveyor is moved ahead to a new position a similar distance inby.

• To provide greater flexibility, however, a modification of this plan is being tested in one section. Here two cross-belts are used, one 100 ft long for Rooms 3 and 4 advanced ahead, and the other 200 ft long, positioned 250 ft outby to handle the other two rooms. Both methods are indicated in Fig. 1.

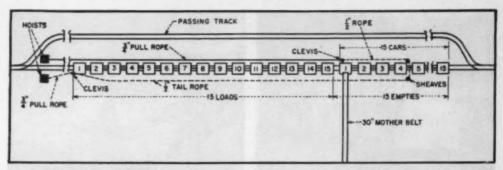


FIG. 2-CONTINUOUS CARLOADING with two spotting hoists. In loading, an empty 15-car "train" is hooked to partly filled train.



CONTROL BOARD for all units is located at the loading station.

THE NO. I MAIN BELT rests on a concrete-block foundation.

With four rooms delivering to one cross-belt, all rooms must be advanced abreast. Otherwise, it is necessary to stop work in the leading rooms to wait for those that lag as moving time of the cross belt approaches. With the new plan utilizing two cross belts, two rooms deliver to each belt most of the time and only the two rooms of a pair must be advanced abreast. Since seam thickness is not consistent, it is the mining of a low spot that causes a room to lag. These thincoal areas practically prohibit any consideration of mobile loaders and shuttle cars in the mine.

• Because of their higher capacity, belts are used for the 200-ft. cross conveyors rather than chains. A large and heavy chain conveyor would be required to carry the full production from two power duckbills (total 120 tph). There also are times, of course, when all four duckbills are delivering to the cross-conveyor, and thus the total rate can be 240 tph.

In mining two 2,000-ft rooms

there are no moves of the power duckbills except straight-line advances at the face. Shaker drives are moved approximately the same number of times as in mining 300ft rooms, but the moves require less labor because they also are in a straight line. The shaker drives have been fitted with side-drive attachments to lower the discharge height, thus reducing the taking of top rock to make headroom at the discharge to the belt. Generally speaking, the saving in full-unit moves with 2,000ft rooms, as compared to the 300-ft rooms, is 14 against 72.

• For handling supplies the present arrangement is to reverse the belts, transporting all supplies on the 30-in main and 26-in section conveyors. From the belt terminal to the face, supplies are pushed by hand on rubber-tired 4-wheel trucks of light-weight under-slung construction (see p 126 of this issue).

Two power-duckbill sections and a main-entry development section now deliver to the 30-in belt, which has its terminus at a mine-car loading station on No. 2 mains 850 ft inby the portal. A control board for all units also is located at the loading point. Since the station is a comparatively permanent installation, the belt drive is mounted on a concrete foundation and the conveyor is set on concrete blocks.

A power duckbill crew, composed of four men, averages 100 tons per shift. To maintain the mine's 2,000-ton production the total payroll numbers 200 men, including the superintendent, all other supervision, mine office help and the tipple force.

Six Goodman G12½ shakers and a mother chain deliver to a 26-in belt in driving No. 2 mains. Top is taken in No. 3 heading, and track installed to handle men and supplies. On this tracked heading, top is abot in 250-ft lifts preparatory to loading with the Whaley Automat. In No. 2 mains it is planned to install the main belt on the No. 2 heading and, at every belt transfer point (450-ft intervals), carry a runaround track from the main supply





NEW COVERED MAN-CARS hold 32 men and have spring-treel seats. The 8-wheel trucks are equipped with spring-mounted journals.

Right is trip of 15 drop-bottom cars carrying 6 tons each enroute to the dump hopper. The mine cars are never uncoupled.





MANAGEMENT TEAM—H. A. Deffron (left), superintendent, Reels Cove mine, and W. J. Travis, manager of Whitwell mines and properties. Supply track parallels the main belt (right). On No. 2 mains now under development, the supply track will be on the adjacent entry, with runaround tracks at intervals.

track being installed on the No. 3 heading.

Men board covered man-cars at the lamphouse, are carried 3,300 ft on an outside tramroad to the portal and then to the underground terminals. The 8-wheel man-cars, made by the Southern Car & Mfg. Co., Birmingham, Ala., accommodate 32 men each and have springsteel seats and spring journals. Car height is 48 in, wheels are 9 in diameter and the car bottom is 12 in above the rail.

Spotting coal cars at the loading point and changing trips is accomplished without delay by use of overlapping mine cars and two hoists, which alternate in pulling the trip. A tail rope returns the hook of one hoist as the other advances the trip. During loading an

empty trip of 15 cars is coupled to the partially loaded 15-car trip, thus in effect permitting loading of a continuous train. While this twohoist system has been used at the mine for several years and was preiously described in Coal Age (May, 1948), positions of the hoists have been changed as shown in Fig 2.

• Because of the unusual characteristics of the roof shale, roof bolting, given a thorough trial in rooms and in tracked haulageways, has been abandoned throughout the mine in favor of wood timbering. Bolting the rooms was too expensive, while in the haulageways the top fell between and around the bolts.

Although roof bolting in rooms held the top for a sufficient length of time, the cost of approximately \$1 per bolt, as compared to less than 10c for a pine post, more than cancelled the advantages of eliminating setting of temporary cross-bars and shifting screw jacks as the duckbill swings across the face.

Roof bolts held satisfactorily on the haulageways for a few months, but then trouble began. Pieces of shale fell between the bolts and in many instances the disintegration loosened the bolts so that they became useless.

Reels Cove mine has sufficient territory available to continue production for at least 50 yr. The No. 2 mains will serve as the permanent haulageway for the life of the mine. J. H. Dickerson, mining engineer, Hutington, W. Va., handles consulting work on mine layout and ventilation for the company.



ONE MAN INSTALLED this 3-in aluminum pipe in 36-in coal in Staneford No. 2 mine.



FOUR MEN would be needed to lift steel equivalent of two

Aluminum Pipe in Low Coal

Light Weight and Easy Handling Reduce Labor Cost and More Than Offset Extra Cost in Low Coal Cost and Other Advantages Result in Standardization on 3-In Lines in All Belt Entries

ALUMINUM PIPE installed nearly 3 yr ago in mines of The New River Co., in Fayette and Raleigh counties, West Virginia, proved to have so many advantages that, in the 3-in size joined by Victualic couplings, it has been made standard for gathering service in 2,000-ft belt-entry sections. Of the approximately 10,000 ft of 3-in aluminum pipe purchased by the company before present restrictions were placed on aluminum products, 7,000 ft are in service in one mine—Stanaford No. 2—where the accompanying photos were made.

• Mining Conditions Pose Drainage Problem—Thin coal and unpredictable local grades ranging up to 25%, resulting in numerous water basins, are some of the adverse conditions encountered in Stanaford No. 2. For continuous operation, it is necessary to be prepared to pump from every working place. Therefore, it is imperative that an adequate pipe line be advanced as the belt entry is developed.

Coal thickness ranges from 30 in on the "hills" to 50 in the depths. The seam is the Beckley, which is low in sulphur. Consequently, the mine water is neutral or, at the worst, only slightly acid.



TWO 3-IN ALUMINUM LINES connected to 6-in cast-iron discharge line.

Tests show pH values of 6.0 to 7.0. · Big Pipe Essential-In discussing the aluminum-pipe installation with Coal Age, C. R. Bourland, vice president in charge of operations and a mining engineer with lots of experience in operating wet mines, declared that he had concluded many years ago that 2-in pipe was too small for mine-dewatering service. Most gathering pumps are designed to handle 50 gpm against a 60-ft head. That quantity flowing though a 2-in pipe 600 ft long alone creates a 59-ft friction head. Three-inch pipe cuts the loss to a reasonable figure, and is indicated as the minimum size for 2.000-ft belt entries. A 20-ft length of 3-in standard steel pipe weighs 152 lb. In 36-in coal, it took a minimum of three men to handle these lengths and line them up to start the threads. A 20-ft length of aluminum pipe weighs only 52 lb and, in 36-in coal, can be snaked along the bottom by one man. Using Victualic couplings, he can install the line without help.

• Labor Saving a Major Factor— First cost of the aluminum pipe has averaged 1.6 times the cost of standard black-steel pipe. The saving in the cost of labor for handling the aluminum pipe undergound justifies the additional investment. Cost of the first installation is little more than steel pipe, and successive moves and re-installations bring net savings. The light weight of the aluminum pipe is a special advantage in transporting pipe on belt lines.

· Borehole Applications - About the same time The New River Co. started the use of 3-in aluminum underground, it installed a 6-in aluminum column in the 460-ft vertical air shaft at North Sand Branch, Cranberry mine. The column pipe was needed in a hurry. Aluminum pipe was readily available, while steel pipe could not be found for early delivery. Says C. C. Ballard, master mechanic: "This aluminum pipe with threaded couplings was installed much quicker and at 60 to 70% less labor cost than if steel had been used." As at Stanaford No. 2, the water at Cranberry ranges from neutral to only very slightly acid.

FEED:

Effluent From Heavy-Media Plant Plus Bank Coal

PROCESS:

Froth-Flotation and Classification

PRODUCT:

Standard Anthracite For the Steam Market



FROTH-FLOTATION CLASSIFIER rounds out equipment for preparation of standard anthracite for the steam-coal market. No. 5 Coal is recovered from slurry and culm.

The Park Fine-Coal Plant

THE RHOADS CONTRACTING CO., this year celebrating the 40th anniversary of its founding, now has in full operation the new Park No. 3 fine-coal plant, Park Place, Pa., designed for the following:

1. Recovering finer - than - rice anthracite from the underflow of the Park heavy-media plant (Coal Age, June, 1949).

2. Increasing the percentage of recovery from the company's silt-

3. Preparing a product for the

steam-coal market that will meet standard - anthracite specifications.

The new plant contains two 7-ft Wilmot Hydrotators for cleaning barley and No. 4 buckwheat, and a 12-ft Wilmot froth-flotation classifier for treating No. 5 (3/64-in by 100-mesh). This is the first complete plant engineered and erected by the Wilmot Engineering Co. in the anthracite field using its new froth-flotation system for the preparation of minus 3/64-in culm.

In addition to bank coal, feed to the new plant consists of slurry containing the fines by-passed in the heavy-media plant, where high-refuse strip-mined and marginal deep-mined coal is cleaned. The coal-refuse ratio of the slurry fluctuates because of the variations in the original feed to the heavy-media plant, but sensitive controls on the equipment in the new plant insure consistent high quality.

About 2,500 gpm of water containing 12% solids leaves the





PRIMARY RIFFLE (left) conditions feed by removing excess water and scalping oversize. Barley feed (right) enters cleaner through chute, refuse is discherged by conveyor (background), and overflow (foreground) carries coal to dewatering screen.



PARK FINE-COAL PLANT supplements earlier heavy-media installation by recovering fines from underflow of the heavy-media process. Three loading tracks are provided.

heavy-media plant and is flumed part of the 2,000-ft distance between plants in an open channel of half-sections of 18-in terracotta pipe. At the halfway point, the stream is picked up by a Goyne sand pump and forced the remainder of the way through a 10-in pipeline.

Production from the fine-coal plant in the month of February, 1951, averaged 186 tons of clean coal per shift, divided among the three sizes cleaned. The plant works two 7-hr shifts per day.
• Preliminary Slurry Treatment

Preliminary Slurry Treatment
 —Slurry is pumped to a conical
feed tank in the fine-coal plant.
 Culm, when it is being treated,
 is dumped to this same tank. A
 Barrett-Haentjens deepwell pump
 driven by a 30-hp General Electric induction motor lifts feed
 from the tank to a primary riffle

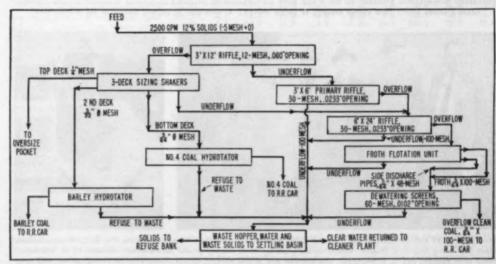
for presizing and partial dewatering. The 3x12-ft primary riffle is dressed with 12-mesh (0.06-in openings) stainless-steel cloth.

The overflow from this riffle discharges to a setting of three Parrish-type sixing shakers and the underflow passes over another riffle (30-mesh-0.0223-in openings), which sends to waste a portion of the minus 100-mesh fines and about 25% of the feed water.

The 8x18-ft top sizing shaker with ¼-in round holes scalps oversize from the feed. This oversize is chuted to a storage bin for truck haulage to the heavy-media plant for retreatment. The middle shaker, 8x30 ft with 3/32-in round holes, retains No. 3 buck, which is chuted directly to one of the 7-ft Hydrotators. The overproduct from the bottom sizing shaker, 8x30 ft, 3/64-in round holes, passes to the other 7-ft Hydrotator as No. 4 buckwheat feed.

The underproduct from the sizing shakers, the overproduct from the 30-mesh riffle, and about 75% of the feed water are directed to a secondary riffle for final conditioning before entering the 12-ft Wilmot flotation machine. The underflow of the second riffle, also 30-mesh-jacketed, carries most of the minus 100-mesh fines and excess water to waste. The overflow, 8/64x100, enters the froth-flotation classifier to be cleaned as No. 5 buckwheat.

· How the Froth-Flotation Equip-



CIRCUIT DIAGRAM shows how plant is designed for continuous flow without the need of expensive hoppers and pockets. Two upward current washers and a froth-flotation unit handle the cleaning operation and produce standard anthracite.

Simplified Operating Circuit Rounds Out Park No. 3 Cleaning Cycle





TIGHT CONTROL is automatic as float rod operates limit switch (left) to actuate refuse-gate motor in steel box (right). J. McGroarty, electrician, points out single adjustment for reising and lowering float to change cleaning characteristics.





HIGH-SPEED DEWATERING SHAKERS for No. 5 coal (left) are independently driven but synchronized to prevent excessive vibration.

Loading chutes (right) have enough capacity to permit changing. R. Beveridge Jr. inspects loading of No. 4 buckwheat.





PLANT DESIGNERS AND OPERATORS—D. V. Randall (left), assistant to the president, Rhoads Contracting Co.; G. L. Wilmot, president, Wilmot Engineering Co.; C. L. Kovatch, Wilmot service engineer; H. H. Finton, general superintendent, Rhoads; H. R. Middleton, Wilmot sales manager; and C. E. Mochamer, vice president and general manager, Rhoads. Absent when the photograph was made were: Rebert F. Beveridge Sr., in charge of the fine-coal plant for Rhoads, and H. R. Randall, president, Rhoads Contracting Co. Analyses of all loaded cars are made by J. T. Purcell, osel inspector (right).

ment Operates—The froth-flotation unit consists of a tank, an agitator with positive drive, a main pump, two heavy-duty Wilmot dewatering shakers, and a refuse conveyor. The 12-ft model has a rated capacity of 45 tph feed and 30 tph clean coal. However, the inherent flexibility of the machine permits from 50 to 75% greater tonnages to be handled with satisfactory results when necessary.

• Flotation reagents—No. 2 fuel oil and Hercules Yarmor pine oil are drop-fed by a Clarkson reagent feeder into the suction end of the main pump. Flotation air is introduced in the suction side for circulation with the other reagents. Records on reagent consumption indicate that the production of 100 tons of clean coal requires 3 gal of fuel oil and 1½ gal of pine oil. With fuel oil at 12.1c per gallon, reagent cost is 1.52c per ton of clean coal.

The separation process in the Wilmot flotation unit combines hindered settling, as in the conventional Hydrotator, with froth flotation. Collecting pipes on a manifold 18 in below the surface of the water in the tank gather large fines that do not rise with the froth. The manifold discharges this clean coal to the dewatering shakers. Froth is scraped into a peripheral launder by rotating blades, the launder also discharging to the dewatering shakers.

The two double-arm shakers for dewatering No. 5 coal are individually driven, but their drive shafts are connected by a jaw-type coupling to keep them in synchronism, thus reducing vibration in the plant structure. The screens are dressed with 18x17-in panels covered with 60-mesh stainless-steel cloth to permit easy and economical renewal.

• Loading and Refuse-Disposal— Clean No. 5 coal is chuted directly from the dewatering shakers to railroad cars. The plant is served by three loading tracks, one for each of the sizes cleaned.

Underflow from the 30-mesh riffles and refuse from the two Hydrotators and the flotation unit are sluiced out of the plant to a settling basin by the excess feed water. Some of the clarified water overflowing the settling basin is impounded and recirculated, about 1,000 gpm being used in the plant for sprays on the sizing shakers and as makeup water for the Wil-

Performance Data—Froth-Flotation Circuit

	Percent			Percent-					
Mesh	Weight	Wt.	Ash	Cum. Ash	Mesh	Weight	Wt.	Ash	Cum.
-	Food to	Secondar	y Riffle		No. 5	Coal fre	m Dewe	stering !	hakers
36	3.0	8.0	19.0	19.0	364		2.8	6.1	6.1
1/10.	6.7	9.7	17.0	17.6	1/10		24.8	7.4	7.8
	11.9	21.6	20.2	19.0		. 31.2	56.0	9.0	8.2
	11.3	32.9	17.1	18.3		23.4	79.4	12.9	9.4
	18.2	51.1	20.7	19.2	100		96.5	18.5	9.8
100	11.9	63.0	24.1	20.1	200		98.3	17.3	9.9
	17.0	80.0	27.7	21.7	200		100.0	28.0	10.2
-200.	20.0	100.0	41.2	25.6					skers
Feed to Flotation Unit (32.6% Solids)				Underflaw from Dewatering Shakers (3.6 % solids)					
94.		1.1	22.6	22.6	48	. 5.3	5.2	13.0	13.0
364		6.1	23.0	23.0	65	. 33.2	28.4	16.8	16.2
	20.8	26.9	23.1	23.0	100		53.5	28.4	21.9
	24.4	51.3	20.0	21.6	200		80.5	34.0	26.0
	19.0	70.3	22.9	21.8		. 19.5	100.0	45.4	29.7
	15.0	86.3	21.9	21.8	Ref	use from	Fletatio	n Classi	
100	7.0	92.3	21.0	21.7	-200.	. 0.6	0.6	65.9	65.9
200		96.8	23.0	22.2	200		1.5	72.9	70.7
-200.	3.2	100.0	34.9	22.3	100		3.8	80.8	76.8
13	nderflow	of Seenn	dney Rift	fla	65	. 10.8	14.6	82.7	81.2
-		0 % Solid				21.1	28.0 49.1	79.4	80.2 75.5
48					35	25.8	74.9	47.3	65.7
65		4.7	24.8	24.8	364		97.5	38.2	59.3
100		14.0	18.8	20.8	3/a		100.0	30.6	58.7
200		53.6	26.0	24.6		Clean Co	al (Car	Sample)	
	46.4	100.0	42.1	32.7	94		3.0	6.3	6.8
	Clas	milior Fr	44.		364		24.0	7.3	7.3
				9	35		54.8	8.3	7.8
364		4.4	6.3	6.3		. 23.5	78.3	10.6	8.7
½	25.8	30.2 53.6	7.9	8.6	68		91.9	13.4	9.4
48		71.0	10.0	8.9	100		96.3	18.5	9.8
65	14.6	85.6	9.0	9.0	200		96.7	17.6	10.0
100		92.7	9.0	9.0	-200.	. 1.3	100.0	27.6	10.2
200		97.5	10.7	9.1	_				
-200.	2.5	100.0	20.9	9.3	Float	-Sink D	ata Cla	ssifier	Feed
	Coal from	Callean	ina Dina				64 × 10		2.25
		.9 % Soli				(0)	Perc		
364	3.4	3.4	7.7	7.7	Sp Gr		Cum.		Cum.
	16.0	19.4	7.5	7.6	ap or	Weight	Wt.	Ash	Ash
35	25.2	44.6	9.5	8.6		10000			
48	23.4	68.0	13.4	10.3	1.60			5.8	5.8
65		84.4	17.4	11.7		15.0	70.6	14.0	7.5
100	7.5		24.1	12.7		7.7	78.3	26.6	9.4
200	4.7	96.6	29.0	13.5	1.90		100.0	32.1	10.1
-200.	3.4	100.0	41.2	14.4	-1.90	19.1	200.0	****	20.1

mot automatic controls on the three units. The remainder runs off in full compliance with Pennsylvania's "clean-streams" law.

The refuse-disposal system and the coal-loading facilities direct to the car eliminate the need for pockets or storage bins. All refuse is gathered at a central point and sluiced away, as noted, and the gate - controlled loading chutes have enough surge capacity to permit uninterrupted operation while cars are being changed.

A noteworthy improvement on Wilmot machines is a patented monitor on the refuse gate, which provides automatic control of the coal-cleaning process. Previously, the float in the refuse column operated the gates through a system of ropes and pulleys. Now, the float arm operates a Square D

limit switch, actuating a pilot motor that opens and closes the butterfly-type refuse gate and the water-feed valve. Reverse relays are provided so that the refuse gate may free itself of oversized material to prevent jamming. The length of the float rod can be adjusted manually to secure desired cleaning characteristics.

Plant equipment is powered by 13 General Electric Tri-Clad motors for a total connected load of 175 hp. Westinghouse Life Line starters, installed at a central control station, control motor operation.

ation.

H. H. Finton is general superintendent of both the heavy-media and fine-coal plants, with the latter under the direct supervision of Robert Beyeridge Sr. Four men per shift operate the new plant.





KEY TO BETTER SHOOTING AND COMPLAINT REDUCTION is the MS connector. Left is a close-up of two connectors in perallel to guard against misfires in a trunk line of detonating fuse. Right is connection to a branch line into a vertical hole.

Maumee Cuts Complaints and Gains Other Benefits by . . .

Shooting With MS Connectors

Problem: Adverse Public Reactions to Heavier Shooting Necessitated by Deeper Overburden Solution: Detonating Fuse and Millisecond Connectors, Also Providing Other Operating Benefits

AN ABRUPT and substantial reduction in complaints is one of the more vital gages of the results in decreased vibration being attained in shooting overburden with new millisecond connectors incorporated in detonating-fuse lines at strip mines of the Maumee Collieries Co., in Indiana. Tests with detonating fuse and the new delay connectors were made in late March and early April, with results so satisfactory that it was decided to go completely to this type of detonating medium at all four of the company's mines.

As with many other stripping companies, Maumee has been confronted with a growing number of complaints over blasting vibrations, even though seismograph readings have shown that the vibrations, at any reasonable distance away, are not sufficient to cause damage to any structures. Only when houses or other structures have been very close has any definite and discernible damage occurred as a result of vibration.

Recognizing, however, that the mere presence of vibrations, even though not intense enough to cause damage, tends to generate complaints, and recognizing also that thicker overburden adds to the magnitude of the problem, the company for a number of years, under the supervision of Robert L. Akre, drilling and shooting superintendent, has experimented with practically all known methods and devices designed or suggested to

reduce blasting vibrations. At the same time, it has followed a policy of meeting complainants, or possible complainants, more than halfway in adjusting shooting methods, in making preventive or post-shooting repairs, and in settling complaints that reach the claims stage fairly and without delay. Only once has it been necessary to go as far as arbitration, and no complainant has as yet found it necessary to take his case to court.

Test shots also are made regularly with a "falling pin" seismic device, and records are kept of dates, quantities of explosives used per shot, distance of set-up from shot, and type of structure tested. Pins have remained standing in all instances, except for a few heavy shots less than 500 ft away.

 Delay Shooting Introduced—A little over 2 yr ago, in spite of all the measures being taken, complaints from residents of Dugger, Ind., became numerous and insistent. At that time the pit for Mine 27 was 1 mi from the corporate limits, and shooting was being done in blasts ranging from 2,500 to 7,000 lb of explosive in both vertical and horizontal holes detonated by instantaneous caps.

A specialist in seismic vibrations was employed to check the vibrations with a recording-type seismograph, and records were made in the town on shots up to 21,000 lb of 60% gelatin. All vibrations recorded were not sufficient to cause structural damage. The town residents, however, were not convinced, and complaints and claims continued.

In the meantime, during which the number of complaints from Nos. 20 and 28 was growing, efforts were made to cut down the size of shots. The number of holes in each shot was restricted to six, then four, and then even two in some instances. As a result, shots were more numerous and much shooting had to be done at night. Complaints increased in volume and intensity.

Shooting with alternate holes fired by 25-millisecond delay caps was introduced and gave good results most of the time. Consequently, it became possible to fire shots up to eight holes. However, possibly as a result of the variation in actual delay time in the nominally 25-MS delay caps, vibration results varied, with some good and some bad. Overburden breakage was materially improved, although again results were variable.

Tests then were made on shots up to 35 to 40 holes fired by a patented blasting timer detonating the charges electrically at 20-MS intervals-or shorter or longer depending upon the setting. Results in breakage and reduction of vibrations were excellent. In most instances it was noted that vibrations were milder with 35-hole shots than those with a lesser number. However, use of the timer involved complicated wiring to each hole, and much labor was required. It also was found that holes failed to fire on many timer shots. Consequently, reliance continued to be placed on first-period delays alternated with instantaneous caps until the new MS connectors became available.

 Thicker Overburden Complicates Problem—In the past 2 yr or so, Mines 20, 27 and 28, all dragline or dragline - and - shovel operations, have encountered heavier overburden and rock formations, and shooting requirements have grown proportionately with the changes.

The bank at No. 20 averages 65 ft, with 6 ft of limestone about 10 ft over the coal. Stripping is done in a modification of the parallel-tandem system developed at No. 20, using a dragline with 215-ft boom and 25-cu yd bucket, and a shovel with 18-cu yd dipper.

All shooting is done with 10-in vertical holes, put down by Bucyrus-Erie 42-T drills. Rows of holes are 25 ft apart and the spacing in the rows is 25 to 30 ft, with holes in one row staggered from those in the next. Normally, the four drills work ahead on the dragline bench putting in three rows of holes per cut of 80 to 100 ft. The first row normally is 30 to 45 ft from the edge of the highwall. Thus a "buffer strip" is maintained to minimize the quantity of material jarred into the pit by the shots.

Holes are loaded immediately after drilling with 350 to 750 lb of 67% weight-strength ammoniatype explosive in 8½-in 50-lb cartridges. With instantaneous or delay caps, the holes are primed with a charge of 60% gelatin containing two electric caps. Cap wires range from 70 to 90 ft long. Delay caps of the 25-MS type have been used in alternate holes and firing has been done at six holes per shot.

Overburden at Mine No. 27 ranges from 35 to 70 ft in depth, with a layer of sandstone 5 to 35 ft thick at varying depths below the surface. Stripping equipment consists of 15-cu yd dragline and an 18-cu yd shovel, operating either in tandem or, recently, in separate

Two 42-T drills have put down all the holes in the deepest parts of the pits, with a horizontal drill for overburden less than 50 ft deep. Drilling and shooting are similar to that at Mine No. 20, except that the horizontal holes are 6 in in diameter and are drilled 3 ft above the coal on an average spacing of 21 ft. Usual hole depth is 80 ft. These horizontal holes are loaded with 250 to 550 lb of the same type of explosive used at No. 20. except in 5x25-in cartridges. With electric caps, two cartridges usually are loaded before the primer, also gelatin with two caps with 80-ft wires, is inserted.

Overburden at Mine No. 28 ranges from 45 to 95 ft in depth, with a middle layer of sandstone. Two 42-Ts and one horizontal drill prepare the bank for shooting, much the same as at Mines 20 and 27. Spacing and loads vary with

the depth of the overburden, which is removed by a 30-cu yd dragline with 180-ft boom.

Monthly yardages at the three mines, at the time this description was prepared, were running approximately as follows: No. 20, 900,000 cu yd with the dragline working 720 hr per month and the shovel about 320 hr; No. 27, 750,000 cu yd; No. 28, 800,000 cu yd;

Overburden broken by shooting ranges from 2½ to 5 cu yd per pound of explosive at the three pits. Shooting is designed to produce easy digging for the draglines, requiring an estimated 50% increase in explosive compared to shovel operation.

• Delay - Connector Experience—With, as noted, extremely deep overburden and hard rock, total consumption of explosives at the three mines is now averaging 700,000 to 900,000 lb per month, compared to 400,000 to 600,000 when the depth was 60 ft or less. This, in part, is an indication of the increase in the problem of controlling blasting vibrations.

Early in March the British pat-"MS Connector" ented became available in the United States. It consists of a 26-in length of detonating fuse (Cordeau-Bickford Primacord) with a 16-millisecond delay built into the center. When used with Primacord, the purpose is to effect a 16-MS delay between each hole in a shot. Use of the connectors was first observed at a neighboring operation, where 35 horizontal holes loaded with over 10,000 lb of explosive were detonated in series in March by the use of Primacord and 16-MS connectors. Vibrations observed were about 25% of those normally experienced with the usual shots.

Primacord had been used from time to time at Maumee operations for years, though with the change-over from gelatin to the less-sensitive ammonia explosives in recent years the trend was to the increased use of electric caps. This reflected occasional failures because of cutting of the Primacord or lack of solid contact with the explosive cartridges. Most of the failures, however, are now thought to have been a result of lack of care in loading the holes or lack of adequate priming.

In delayed-action shooting, also, there is danger that movement of the strata following detonation of the first holes might cut the Primacord in later holes. However, with a Primacord detonating speed of

Test Shots and Operating Experience Prove Connector Benefits

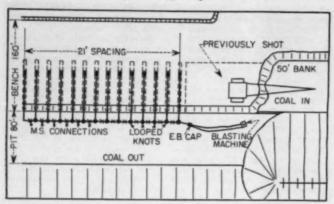


FIG. 1—TEST SHOT March 30 with horizontal 6-in holes 80 ft deep at Mine 27: eight 5 x 25 cartridges in back, 60% gelatin primer with detonating fuse looped and tied, explosive to 50 ft, 30 ft of stemming.

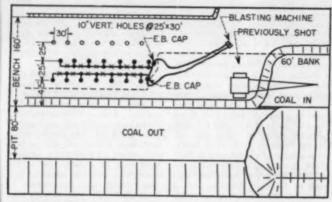


FIG. 2—TEST SHOT April 4 at Mine No. 20 with 10-in vertical heles loaded with about 620 lb ammonia-type explosive, detonating fuse to 60% gelatin primer near bottom and MS connectors between heles.

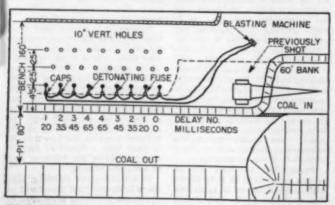


FIG. 3—TEST SHOT April 4 at Mine 20 with 10-in vertical holes loaded with about 600 lb ammonia-type explosive, detonating fuse to 60% gelatin primer near bottom and delay caps as indicated.

20,350 fps, compared to 7,000 to 9,000 fps for ammonia-type explosive, missed holes for this reason should be few, if any, in the opinion of those responsible for shooting. Use of Primacord instead of electric caps is slightly more expensive up to the point where 80-or 90-ft cap wires are required. At this point costs are comparable.

About the middle of March Maumee was able to obtain a supply of 16-millisecond connectors and made two carefully prepared experimental tests—one at No. 27 mine on 6-in horizontal holes and one at No. 20 mine on vertical 10-in holes.

The first test at Mine No. 27 on March 30 involved two shots, one with delay and instantaneous caps and the other with Primacord and MS connectors. In each instance a pin machine was set up in a house about 1,000 ft away, and in the mine office about 1,500 ft away.

The first shot involved 4,500 lb of explosive in nine holes 80 ft deep on 21-ft centers, detonated with alternate instantaneous and 25-MS delay caps. Pins in the pin machines were rocked, though none fell.

The second shot consisted of 14 holes, same spacing and depth, with about 8,500 lb of the same explosive, detonated with Primacord with 16-MS connectors between each hole. Eight 5x25-in cartridges were placed in the bottom of each hole, followed by a gelatin primer with the Primacord branch line looped and tied to it. The remainder of the charge was placed in front of the primer. Total length of the charge averaged 60 ft, followed by 20 ft of stemming tamped in.

The Primacord trunk line was then laid along the base of the high wall and each branch was tied to it with a looped knot—firmly but not so tightly as to compress or damage the Primacord. The trunk line then was cut between each hole and two 16-MS connectors—to insure continuity—were tied in with similar loop knots. A regular 10-ft electric cap then was taped to the end of the trunk line nearest the previously shot bank, and the shot was fired.

Location of the primer in the middle of the charge was not usual Primacord practice. The gelatin primer was inserted to make sure that all the explosive was fired by its shock impact, and detonation of the eight cartridges depended entirely upon this effect. It was



ROBERT L. AKRE (left), Maumee superintendent of drilling and shooting, poses with engineering personnel and part of the Chieftein No. 20 drilling and shooting crew, including (left to right) R. K. Hartman, survey-party chief; Arthur Tryon, party member; Wayman Burdette (fourth from left), No. 20 drill foreman; and, sixth from left, George Bullerdick, survey-party member.

thought that some further delay might also result from this scheme. Ordinarily, the primer would be located at the back of the hole, with the Primacord extended full length to assure instant detonation of each cartridge. However, the Primacord must lay directly against each cartridge. Even a gap of a fraction of an inch may result in failure to detonate.

Fig. 1 is a diagram of the shot using the MS connectors. Compared to the shot using delay and instantaneous caps, the vibrations were milder to the extent that the pins showed no quivering. The shot heaved a portion of the bank across the pit and fragmentation appeared better than usual. It was later discovered, however, that the fifth hole failed to fire, probably as a result of a faulty knot at the connection between the Primacord trunk and branch lines.

• Vertical-Hole Tests—Two shots with vertical holes were made at No. 20 mine April 4, both in overburden approximately 70 ft, with 8 ft of limestone and 12 ft of black slate overlying the coal. One was a 14-hole shot in two rows with approximately 8,700 lb of ammonia-type explosive. The second was a nine-hole shot, holes in a single row, with 5,400 lb. The arrangements are shown in Figs. 2 and 3. The 14 hole shot was detonated

completely with Primacord extend-

ing to gelatin primers near the bottoms of the holes. The nine-hole shot was made up with Primacord leads to the primers, with a series of delay caps taped to each lead and fired electrically. All the holes were fired in pairs in both instances.

The pin machine was set up on the second floor of a dwelling 500 ft away, and observers were stationed in the dwelling of one of the bitterest complainants about 3,500 ft away. Vibrations were minor with each shot. Occupants of both houses agreed that if shooting in that manner could be continued no further complaints would be made. They had been up in arms about four- and six-hole shots fired the previous night.

· Detonating Fuse and MS Connectors Adopted-As a result of these tests, Mr. Akre decided that all future blasting at all four Maumee mines would utilize Primacord and MS connectors. Among the benefits are a greater number of holes per shot and elimination of night shooting, when vibrations are more noticeable and irritating. In addition, it eliminates the hazards involved in loading cased vertical holes where it has been necessary to charge from the drilling machine through the casing. and then pull the casing up over the shunted cap wires before moving the machine.

During this operation there is always the danger that stray currents or short circuits might ground through damaged cap wires, detonating the charge. About 4,000 v would be required to set off a regular instantaneous cap, but only 700 to 1,000 v will fire delay caps. With Primacord no cap is used until this operation is complete and the machine has moved away.

Further advantages include a theoretical 15% speed-up in detonation of the explosives, with consequent possible reduction in requirements. Experience to the end of April indicates that this saving can be realized in practice—at least in part. Fragmentation, experience in the same period also indicates, is as good and probably better even with reduced charges.

Finally, since caps are not used in the charges, digging into missed holes is not so likely to result in an accidental explosion. Loading and connecting up in daylight also leads to greater efficiency and accuracy. Study of the conditions encountered in stripping has indicated, however, that care is necessary in using and protecting the connectors where rock falls are a possibility, particularly in connecting up trunk lines in horizontal shooting. This is because the connectors are similar to blasting caps and thus might be set off by falling rocks.

Coal Age New Methods Report-1951 Series, No. 11





EARTH-COVER TREATMENT to extinguish fire in old Arkwright pile on the slope. The pile was worked into eight level steps. One, earth-covered, with trees in the background killed by fire, is shown at the left. Another view of the steps appears at the right.





TRENCH THROUGH CENTER and earth facing isolates new TRENCHES, leveled steps, earth facings and earth covering exdump on top of hill at Brock No. 4 (left) from old dump at right.

TRENCH TRENCHES, leveled steps, earth facings and earth covering exdump on top of hill at Brock No. 4 (left) from old dump at right.



of old Arkwright dump will be covered with dirt.



HOT CRATER which has shown up in the worked-over hilltop part UPPER END OF NEW DUMP at Arkwright No. 1. Ground is cleared as successive layers extend dump up the ravine.





EARTH DAM now 50 ft high at the center and 390 ft long confines and soals off lower end of new refuse pile at Artwright No. I. Refuse-belt terminal and truck-loading hopper show on the skyline (left). Top of dam and seal is shown at the right.

No Gob Fires ... More Goodwill

Christopher Coal's Solution

Refuse Placed at Lowest Elevation, Compacted in Layers and Sealed Against Air on Sides and Ends Long-Standing Fires in Old Piles Smothered by Stepping, Trenching and Earth-Filling as Necessary

SUPPRESSION in a relatively short time of fumes from three burning gob piles at mines of the Christopher Coal Co. Div. of Pittsburgh Consolidated Coal Co., Morgantown, W. Va., was accomplished at a cost looked upon as far less than the value of the goodwill achieved. Furthermore, from the experience gained, a simple method that it is believed will prevent firing in the future was worked out and is being used in disposing of refuse now accumulating.

Morgantown, site of West Virginia University, had for decades suffered from smog, part of which resulted from burning gob piles. Additional pollution of the atmosphere by the Morgantown Ordnance Works during World War II sparked a public reaction resulting in the Morgantown Chamber of Commerce appointing an air-pollution committee and financing a study of its sources and amount. · Early Anti-Pollution Steps-as a first step toward improvement, the government installed equipment to trap the fly-ash at the Ordnance Works. Some time later, and at great expense, it installed additional equipment to catch gases, such as sulphur dioxide and hydrogen sulphide, scrubbed out of the synthesis gas. Coincident with the completion of this improvement, however, the Works was shut down and now only the by-product ovens are operating.

Publicity over the several years and continuance of the smog after the shutdown of the Ordnance Works concentrated public attention on the burning gob. A large pile which had been burning for years at Arkwright mine, acquired by Christopher in 1943, was a sore spot with mining-company officials and with the public. About 4 mi from the center of Morgantown, the flames from this pile were visible at night from a residential section and especially from a hilltop area acquired for University expansion. Dead trees on the hillsides flanking the dumping ground proclaimed the quantity and persistence of the noxious gases.

Extinguishing Old Fires

In May, 1949, C. R. Nailler, since advanced to president, Christopher Coal Co., started an experimental program of covering the fires with dirt. By September, it became evident that plenty of dirt, plus trenching of piles, would put out the fires or at least confine the gases. Beginning the first of that month a 15-yd scraper and tractor outfit was rented and put to work. In 30 days the fires were covered. Now, more than a year later, there has been no recurrence of the nuisance. Only a few spots have started to emit smoke or hot gases again, and those have been recovered at small expense.

The burning pile at Arkwright covered a side hollow 2,000 ft long on a 10 to 15% grade and included a considerable pile on the hilltop itself, which is fairly flat and 200 to 300 ft wide. This pile, hot or burning in many places, was graded into eight level steps and compacted with bulldozers. The "risers" of the steps were faced with 3 to 4 ft of dirt and the "treads" covered likewise. This digging cut the pile into eight sections and left no exposed steep places or sides where air could enter.

At Brock No. 4 Mine, which is the operation farthest out on the Scotts Run, there also was a tremendous pile scattered over a wide hillside. The whole pile had been on fire and, although mostly burned out, contained residual fires in many places. There, trenching was used to isolate the hot spots and these then were leveled, compacted and the exposures covered with

New Methods Provide Protection Against Old and New Gob Fires



TRUCK HAULS DOWNGRADE and compacts refuse leveled by NEW REFUSE PILE at Arkwright No. 1, looking upgrade from top of bulldozer. Smooth compacted pile fills ravine.



earth dam sealing off air at lower end.

The Morgantown Post

ublished every evening entert Sunday by West leginia Newspaper Publishing Company, Post ulding, Elk and Court. Margantown. West inginia. Entered at Morgantown Postaftic as cond-class matter.

C GREER

WEDNESDAY, MAY 3, 1950

Why Not Learn Here?

An expert from England has been in Pittsburgh this week telling Mellon Institute researchers how to control gob piles around coal mines. He is W A Damon of the British Ministry of Health. And when he received orders to put out England's gob fires, he knew he had to find a way to do it. That was during the blitz period of the recent war when the gob fires were serving an reliable beacons for Nazi fliers.

The Pittsburgh papers, with their brevity in reporting Mr. Damon's visit, neglected to say what he told the Mellon researchers about the successful methods he used. But if those researchers want to get some help closer home, they might visit Monongalia County

and see what has been done at the Pittsburgh-Consol mines here.

Technically, the methods used here may fall short of perfection. They do not extinguish the gob fires for once and all. Continued treatments are needed to keep the fires smothered, But an far as public convenience and public health are concerned, the results achieved are satisfactory. The clouds of sulphurous fumes from burning gob are dispatched, and the countryside takes on something of its normal ap-PERTAILOR.

Unfortunately, the Mellon researchers are not alone in neglecting to profit from the Pittsburgh-Consol example locally. We have other coal operators in this county who are quite content to let the gob burn itself out (if it ever does) and who take easy refuge in the excuse that the problem is too big for them. Actually, all that is needed is a little ingenuity, a little money, and a little day-to-day care. If the gob is levelled off, sealed in at the sides, and kept covered with layers of dirt, the nuisance is abated. We don't need to go to England to learn that.

TANGIBLE EVIDENCE of goodwill results is this newspaper editorial.

EDITOR'S NOTE - The newspaper editorial reproduced above is a prime example of the good that can be accomplished for a mining company and the entire industry by active coopera-tion with local organizations. As we have the report, some months before appearance of this editorial public criticism of gob fires burning in the area prompted the Christopher Coal Co. to invite the editor of the Morgantown POST to come and see for himself what it was doing to climinate its share of the nuisance. A company official accompanied the editor on a tour of the project described in this articls and the newspaper published shortly thereafter a series of pictures that graphically illustrated to the entire community the success of the project.

It could almost be expected, therefore, that this editorial should appear months later when a natural opportunity to compliment local enterprise presented itself.

It was the same story up a side hollow from Pursglove No. 8 mine. Part of the old pile had burned itself out. The remainder was trenched, stepped and all exposures covered. Over a year's experience with these piles indicates that for the most part the fires are permanently extinguished. A dozen or so places have broken out but have been smothered in jig time by use of a 5-yd scraper-and-bulldozer outfit purchased by the coal company for the combined purpose of working gob piles, road building and construction jobs.

Initial work in trenching and grading the burning gob piles was hard on the tracks of the bulldozers. Heat and sulphurous fumes resulted in excessive corrosion. Operators of these machines soon developed a special skill in digging into the piles as compared to their cautious and rather ineffective efforts at the beginning.

Handling New Piles

Experience and study while working over the old piles indicated that the previous practice of starting a new dump at the top of a hill or slope was wrong. Instead, the pile should be started at the lowest point where it can be kept nearly level and the sides kept sealed against the entrance of air.

The new dump at Arkwright No. 1 mine is a good example of the new practice compared to the old. Belt conveyors carry the washer refuse, amounting to 1,500 tpd. to a 250-ton truck-loading hopper at the top of a hill (400-ft vertical lift), from which it is hauled to the dumping ground by a 20-ton Wal-



PILED SEPARATELY ready to burn is this accumulation of brush, tree trunks and stumps from cleared area.



THIS 180-FT EARTH DAM seels the lower and of a new gob pile already 1,200 ft up the ravine. It serves Pursglove 8 and 15.

ter truck. For the first 2 yr after the new washer was put into operation (in 1948), the refuse was dumped on the hillside close to the bin. As usual in this type of piling of Pittsburgh-seam refuse, it caught fire in less than a year.

· How New Dumping Is Handled -Space for the new dump was prepared in the bottom of the ravine. All the trees, brush and stumps were cleared out and the dumping was started in the very bottom, the lower end of the pile being protected, or sealed, by an earth dam, or facing, built up as the pile increased. The refuse is dumped in 3-ft layers. Each layer is leveled with a bulldozer and the compacting is done by the 20-ton truck hauling and maneuvering on top of the pile to deposit the next layer. Each layer is extended to the edge of the hill at each side of the ravine. Therefore, no vertical refuse faces are left exposed.

The top of the pile is given a grade of about 2% in the direction of natural drainage. At one side, near the upper end, a circular dam of loose refuse about 4 ft high is maintained to provide a sludge pond 100 ft in diameter. Water from this pond percolates out through the loose material and runs down across the top of the compacted refuse pile. This sludge comes from the new washing plant and is pumped to the top of the high hill, from which it drains to the pond.

Already this new pile at Arkwright has accumulated to a triangle 330 ft across the base (the dam length) and 850 ft long. The dam height is now 50 ft and a small flow of water is coming out of the earthen facing at a point about 30 ft above the bottom, indicating that the refuse pile is saturated with water to that level. With the scraper and bulldozer, the earth dam is maintained several feet higher than the refuse pile. Consequently, there is no open end. As the pile increases in height and width, additional area is cleared to accommodate the expansion.

No wood or other combustible trash is left in the mine and washer refuse. Cleared spots well to one side of the refuse pile are maintained for burning wood and other combustible trash which comes from the mine yard, shops, offices and plants.

At Brock No. 4, where ravine space within reasonable distance is not available for dumping, the new piling is near the top of the hill and above the old dump on a large area that has a gradual slope. As a first step, an earth fill was made to isolate the old dump from the new. As the new dump is built up in compacted 3-ft layers, the lower face is kept covered with dirt.

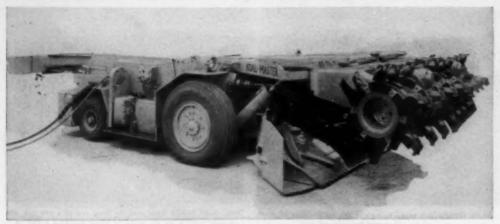
For Pursglove No. 8 and No. 15 mines, the new dump is in the bottom of a gently sloping ravine with the lower face sealed by an earth dam the same as at Arkwright No. 1. Dimensions of this pile have grown to a triangle 180 ft wide at the lower end (the earth dam) and 1,200 ft long.

 Piling Organization and Equipment—Clearing, leveling and earth hauling for the four gob piles at the six mines operated by the Pursglove division, and also the hauling of dirt to cover hot spots that show up occasionally in the old piles, is handled by three men working at this job about 50% of the time. They function under the direction of E. C. Shaw, superintendent of construction, and spend the other half of their time on general construction work around the six wines.

Equipment for this gob piling and construction consists of an International TD14 buildozer kept at Arkwright No. 1 most of the time; an International TD9, usually kep at Brock No. 4; and another TD9, kept most of the time at the refuse dump for Pursglove Nos. 8 and 15. The 5-yd scraper is moved from one dump to another as required

Grades of the streams or dry ditches in the ravines where the dumping is being done are not se steep that there is any danger of the gob piles sliding. Drainage areas are fairly large but experi ence has shown that the piles are quite porous and can absorb a large volume of water. During a heavy downpour, the excess water spreads out over the top of the compacted pile and drains down over the earth facing at the lower end. If a ditch is eroded into the facing it is filled the next time that the scraper and bulldozer are working at that particular gob pile.

While officials of the company are fairly certain that gob piles will never catch on fire if leveled, compacted and sealed at the sides, they know for certain that a pile saturated with water is completely immune. In any event, they have the equipment and know-how to smother a fire quickly. For the top officials of the Christopher Coal Co., one worry has been eliminated.



NEW CONTINUOUS UNIT employs 10 cutting wheels to make diamond-shaped coal projections that are readily broken down by bit action. The first model mines coal 5 to 8 ft high and is adaptable to any coal seam or mining system.

New Continuous Machine

Mine Applications: First Model Makes 12-Ft Cut in 5to 8-Ft Seams; Adaptable to Any Type of Coal and All Mining Systems

New Mining Principle: Cutting Wheels Simultaneously Revolving and Oscillating Produce Easily Broken Diamond-Shaped Coal Projections in the Face for Coarser Coal and Less Fines

A NEW CONTINUOUS CUTTING-AND-LOADING MACHINE employing a new and unusual method of cutting and dislodging coal was unveiled last month by the Lec-Morse Co., Charleroi, Pa. Known as the "Koal-Master," it is the first machine that will continually cut diagonal intersecting kerfs, thus developing diamond-shaped projections in the face of the coal that are easily broken off by the action of the bit tools as the unit advances into the face, the maker reports.

• Extensive operating tests underground since last fall have indicated that the Koal-Master's unusual cutting principle offers wide possibilities for cutting coal with reduced horsepower and is readily adaptable to any type of coal structure or seam, the company says. The major features it emphasizes include:

 Deep cutter-bit penetrations that produce coarse cuttings and a minimum of fines.

2. Complete gathering of cut coal, with no spillage.

3. Flexibility that permits machine operation in variable seam heights and in all mining systems.

4. A cutting cycle the machine

operator can easily follow.

5. Simplicity in machine design

that offers long service and easy

6. Identical cutter bits that assure uniform wear and long life.

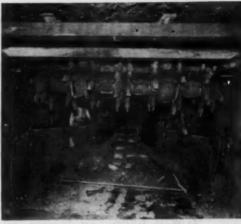
• Designed for high coal and full entry cutting, the first Koal-Master built cuts a 12-ft-wide entry and can work seams varying from 5 to 8 ft high. Weighing a total of 20 tons, the machine is 48 in high over-all, 96 in wide and 25 ft 7 in long. It will cut and load at a rate of 2 tons per minute and operates on 230 v DC at 350 to 400 amp.

The Koal-Master consists of a 4-wheel rubber-tired chassis, 2-wheel drive and 2-wheel steer, with the necessary traction drive units. A hydraulic power unit, driven by a 15-hp motor, furnishes hydraulic power for the various operations. The unit has a high tramming speed of 2 mph. Its low speed is continuously variable from 2 to 20 fpm for cutting coal.

Mounted on the Koal-Master chassis is a conventional flexible-type conveyor and gathering head similar to that used on mobile-type loading machines. A "cutter-boom" mounted above the gathering head and conveyor consists of a heavy steel structure hinged at its rear end to the chassis and supported on the forward end by two double-acting hydraulic jacks, which move the front end of the boom between the floor and the roof.

. The unit has two 60-hp main cutter motors, one on each side of the boom, driving a "cutter-head" which is mounted on the forward end of the boom. On the first model, each cutter-head carries five "cutting wheels," or a total of 10 cutting wheels for the machine. The wheels are spaced 15 in apart and oscillate approximately the same distance. Each cutting wheel can accommodate a maximum of eight cutter arms and bits and is drilled to permit changing the number of arms and bits from eight to as few as desired. Present





START OF CYCLE as the new miner sumps in at top (left). Vertical motion of cutting boom is provided by double-acting hydraulic jacks seen here. Front view (right) shows the conventional-type gathering head under the cutting boom.

tests indicate that four arms is a very satisfactory arrangement for the Pittsburgh seam.

Cutting by the Koal-Master is accomplished by simultaneously rotating and oscillating the cutting wheels so that each cutting bit moves in a diagonal path. As the paths are automatically reversed by the oscillatory motion, the result is a series of diagonal intersecting kerfs.

The present unit has been geared to produce one revolution of the cutting wheel while the cutting-head moves from center position to the extreme outer position and back to center again or, in other words, one revolution for each oscillation.

 Almost any reasonable variation in the diamond pattern can be made by changing the variables of this compound motion. For example, by simply changing the number of cutting bits on each wheel the present model can cut large or small diamonds. The choice depends entirely upon the coal structure and the end-product size desired.

All cutting bits are identical and travel at the same speed. They are mounted on a solid tool holder with heavy shafts and anti-friction bearings. The entire cutting device may be compared to a heavy-duty milling machine. The sturdy construction and solid mounting of the tools permit deep penetration of each bit and results in coarse cuttings instead of the conventional bugdust, the maker points out. It also is emphasized that this method of mining with a milling cutter produces the dia-



CYCLE COMPLETED, machine pulls back to level floor. Cut face shows diagonal cutting pattern, while roof, ribs and floor remain smooth.

mond pattern only in the direction in which the cutter is fed. Therefore, the roof and floor, as well as the ribs, are smooth.

An actual operating test showed the following size consist of coal loaded by the unit: ¼x0, 21.97%; ¾x¼, 21.72%; 2x¾, 25.74%; and 2-in and over, 30.57%. These sizes were somewhat better than the same mine produces with conventional mining equipment, it was reported.

Sumping force for the Koal-Master is produced by a combination of traction and special rib jacks. While that method has worked very satisfactorily, further improvement in the arrangement of the cutters might permit sumping without the rlb jacks.

The machine is equipped with

two hydraulically powered roof drills, one on each side, with a low gear for setting the roof bolts.

The Koal-Master's normal repetitive cycle is as follows:

1. Elevate cutter-head to roof.
2. Sump cutter to a depth of approximately 24 to 30 in.

3. Cut down, with the machine stationary and the boom moving down to the floor.

4. Pull back with cutter on the floor to smooth out floor cut.

Recent operating tests indicate a very-favorable kwhr-per-ton ratio, plus a steady power demand during the cutting cycle, it is reported. The 60-hp motors did not become hand-warm at any time. The tests also indicated that improved bits will improve even the present power demand.

Underground-Haulage Trends At Bituminous Mines

USBM 25-Yr Analysis of Equipment Use Shows . . .

Belt-Conveyor Haulage Expands Rapidly in Last 5 Yr Rope-Haulage Grows Substantially in Recent Years Locomotives in Use Remain Constant, With Gradual Change in Types

By W. H. YOUNG, Chief, Bituminous Coal Section, And R. L. ANDERSON, Engineer-Economist, Bureau of Mines. U. S. Department of the Interior

VIRTUALLY ALL UNDER-GROUND TRANSPORTATION of bituminous coal in the United States is accomplished by one or a combination of the following methods: animals, locomotives, rope-haulage units, conveyors and shuttle cars. During the past 25 yr (1924-1949) the number of animals used in bituminous coal mines decreased from 36,000 to 10,000, whereas the number of locomotives has remained virtually constant at about 15,000 (Table I). Rope-haulage units increased from less than 1,000 to about 5,000 during the same period. The two other types of haulage units-conveyors and shuttle cars-are comparatively new.

The following summaries were

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compiled from annual reports on production and mine operation submitted by bituminous coal operators and include all mines annually producing 1,000 tons and over. An earlier study, "Bituminous Haulage Marked by Locomotive and Conveyor Rise," published in Coal Age, January, 1947, included mines with an average daily production of over 50 tons, and all mines with rail or river connections regardless of size. Although the 1947 article was based on only about 50% of the total number of mines, it covered 98% of the total underground tonnage.

· ANIMALS-Prior to 1880, nearly all deep-mined coal was hauled by animals. The mule is most frequently associated with coal mines. In 1949 there were about

2.000 bituminous coal mines that used only animals for underground transportation. These were small mines, and their total production was less than 14 million tons, or about 4% of the total underground output.

· LOCOMOTIVES - Gradual changes have been made in the type of locomotive used in coal mines during the past quartercentury. In 1924 there were 85 compressed-air locomotives, 226 gasoline and 132 steam locomotives, or a total of 443 locomotives other than electric in use in underground bituminous coal mines. In 1949, only 59 locomotives other than electric were reported. Many reported in both 1924 and 1949 probably did not operate underground but were used for outside haulage. Many of the early storage-battery locomotives were built as a "combination trolley-and-battery locomotive." In 1924, 779 such locomotives were reported, but today we have no record of any used in bituminous coal mines.

• ROPE - HAULAGE UNITS -This tabulation includes both portable and stationary hoists but excludes scraper hoists, shaft and main-slope hoists, and hoists used for car shifting at conveyor heads or slope conveyors. There were 649 rope-haulage units reported

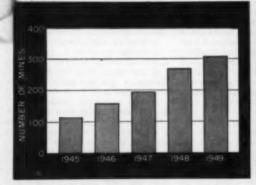
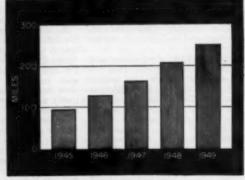


FIG. 1-UNDERGROUND BITUMINOUS MINES in the United FIG. 2-TOTAL LENGTH of "mother" conveyors in use at under-States using "mother" conveyors.



ground bituminous mines.

in use in 1924, but this figure is not considered satisfactory because of the fact that producers misunderstood the questionnaire. Other evidence indicates a very substantial growth in the use of rope-haulage units, and since 1946 the record indicates approximately 5,000 in use. About 70% of the total in use at underground bituminous coal mines are in Pennavlvania.

"MOTHER" CONVEYORS

Belt-conveyor haulage is growing rapidly. The total length of "mother" conveyors in underground bituminous coal mines increased from 97 mi in 1945 to 247 mi in 1949, or 154%. In 1949 there were approximately 60 mines that used 100% belt-conveyor haulage and 250 that used a combination of belt conveyor and locomotive. The mines with 100% belt-conveyor haulage were smaller than those with combination haulage, averaging about 100,000 and 250,-000 tons of annual production, respectively, in 1949. Figs. 1 and 2 show graphically the growth of "mother" conveyors from 1945 to 1949. Table III shows 1949 data on "mother" conveyors by states. Production at mines using "mother" conveyors increased from 9% of the total underground output in 1945 to 21% in 1949.

The figures in this article for 1945 to 1949, inclusive, represent only the "mother" conveyors that were 500 ft or more in length, and thus a new statistical series was started. Data for 1940 and 1944, published in the previously mentioned Coal Age article included all "mother" conveyors reported, many of which were less than 500 ft long. The 1944 figures showed 644 "mother" conveyors in use, with an average length of 804 ft and a total length of 98 mi. By eliminating those under 500 ft in 1945, the number of units was reduced by about one-half, but their total length was hardly affected.

· SHUTTLE CARS-Data on the number of shuttle cars in use in bituminous coal mines were first collected for the year 1949. Virtually all shuttle cars are used in conjunction with mobile loaders or continuous miners. In 1949 there were approximately 1.560 mobile loaders and continuous miners in bituminous coal mines that loaded into shuttle cars, and 41% of the total coal loaded by mobile loaders was handled by shuttle cars.

How the Haulage Picture Has Changed in 25 Yr Table I-U. S. Underground Bituminous Coal Mines and Total

Haulage Units in Use in Selected Years¹

1924	1946	1948	1949
7,352	5,888	7,108	6,798
36,352	10,185	10,834	10,313
			14,0900
			14,090°
		904	503
443	110	74	
14,723	15,231	15,595	15,0773
			1
4	4,084		3,904
4	1,009	1,044	1,073
649	5,093	4,930	4,977
4	457	755	H60
			2,144
4		2222	623
4			2,767
	7,352 36,352 12,7652 1,515 443 14,723 4 649 4	7,352	7,352 S,888 7,108 36,352 10,185 10,834 12,7652 14,110 14,617 1,515 1,011 904 443 110 74 14,723 15,231 15,5954 4,084 3,8864 1,009 1,044 649 5,093 4,9304 457 755

Exclusive of lignite and Virginia semianthracite mines in 1946, 1948 and 1949.
 Includes combination trolley-and-battery locomotives.
 Revised.
 Data not available.

"Mother"-Conveyor Length Over Double in 5 Yr Table II-U. S. Underground Bituminous Coal Mines Using "Mother" Conveyors, Units in Use and Length, 1945-49"

Year	Number of Mines	Number of Units	Average Length (Ft)	Total Length (Mi)
1945	. 117	359	1,438	97.6
1946		457	1,484	128.5
1947		594	1,470	165.3
1948		755	1,460	208.8
1949	. 311	860	1,519	247.5

Includes all mines using belt conveyors, other than main clope conveyors, 500 ft and over length, for underground transportation of coal. Excludes lignite and semianthracite mines.

Three States Lead in Use of "Mother" Conveyors Table III-"Mother" Conveyors Used in U. S. Underground Bituminous Coal Mines, by States, 19491

		nes Using r" Conveyors	"Mother" Conveyors in Use		
State	Number	Production (Net tons)	Number of Units	Total Length (Mi)	
Alabama	4	978,619	22	6.1	
Arkanses		138,626	11	2.3	
Celoradn		3	3	1.4	
Illinois		4,035,589	38	9.9	
Indiana	3	898,131	3	0.9	
Iowa			4	0.7	
Kentucky		11,739,083	143	38.9	
Maryland		216,129	6	1.6	
Ohio		2,855,289	34	11.2	
Oklahoma		561,705	10	2.2	
Pennsylvania		12,352,501	143	39.7	
Tennessee		514,377	13	4.3	
Utah		1.189.614	10	2.8	
Virginia	2.0	2,857,526	27	9.1	
West Virginia		28,990,258	382	113.8	
Wyoming		3,508,651	11	2.6	
Undistributed		111,521			
Total	311	69,947,713	860	247.5	

Includes all mines using belt conveyors, other than main slope conveyors, 500 ft and over in length for underground transportation of coal. Excludes lignile and semianthractic mines.
 Included under "Undistributed."

· DETAILED DATA - Statistics the preceding summaries, were on haulage equipment used in underground bituminous coal mines, by states, for the years shown in

published by the Bureau of Mines as a Supplement to Weekly Coal Report No. 1742, Feb. 1, 1951.



SHOT INTO THE ROOF-maintenance man points to signal-wire hanger fastened to top in a few seconds. In his hand is the 41/2-lb driver using a blank cartridge for power. Use is restricted to well-ventilated crees and eye protectors are worn.

How Vesta Uses Powder-Power

Problem: Quick, Easy Installation of Anchors for Hanging Wire, Cable, Pipe and Equipment

Solution: Powder-Powered Tool for Shooting Studs Into Wood, Steel and Rock

INSTALLATION of signal wires, telephone lines, Airdox piping, trolley lines, ground cables and other essential equipment in underground mines always has been a time-consuming operation. In most cases it is necessary to drill tediously into steel beams, sand rock or concrete block and set anchors to hold the insulated hangers for this equipment.

In today's mechanized mining operations it is vitally important that communications and power lines be installed speedily to keep up with the working faces. This problem has now been solved at Vesta-Shannopin Coal Div. mines of Jones & Laughlin Steel Corp. through the utilization of an unusual maintenance tool that can accomplish in minutes the same job that would

require hours with conventional equipment.

The tool, a cartridge-powered driver developed by Mine Safety Appliances Co. and distributed by the Velocity Power Tool Co., Pittsburgh, literally "shoots" threaded studs into steel, concrete or and rock. Lightweight (4½ lb) and self-contained, it requires no power connections and can be carried by the maintenance crew in a small metal case containing a supply of studs.

Vesta Applications

Originally, one of the tools was acquired at Vesta Mines 4 and 5 for a specific job that had been causing

difficulty — hanging trolley lines from insulated hangers. Drilling into H-beams used for roof supports in the main haulageways required an excessively long time. With the Velocity-Power tool, it was learned, one man could fasten a trolley line hanger to an H-beam in 1½ min. A %-in male-threaded stud was driven solidly into the steel by the cartridge power of the tool. To the %-in stud threads, a %-in adapter was screwed and the insulated hanger was fitted to the adapter.

The simplicity of this operation and the tremendous time it saved led to the use of the same tool for other maintenance work. Telephone and signal-wire hangers now are fastened to sand rock roofs quickly and securely. Airdox lines and ground cables are anchored to steel beams and solid-concrete blocks. The tool even is used in lamphouses where Edison batterycharging racks are anchored to the concrete floor in a fraction of the time that would be required if the concrete had to be drilled and plugged. Hangers for stretcher outfits, first-aid kits and fire extinguishers, which are located at strategic locations throughout all J&L mine properties, are pinned to concrete-block walls or steel columns with this "jack of all tools."

Because the tool can be used to fasten steel to steel, steel to concrete, and wood to steel or concrete, the possibilities for its use in and around mines, tipples and washing plants are great. Repairs even can be made to mine cars with the tool. Larger models were used by the navy during World War II to pin steel plates over holes in steel hulls both underwater and above water.

How the Tool Works

In brief, what this tool does is to harness the terrific power of a small quantity of gunpowder to drive studs so solidly into steel that they can resist a pull of several thousands of pounds. Studs and blank cartridges are fastened together by a piston-like arrangement so a portion of the cartridge remains in the barrel after firing. This eliminates flash and recoil and prevents a stud from ricochetting if the material to be penetrated is too hard. Accidental discharge of the cartridge is prevented by a springloaded lever that must be rotated 180 deg within the handle before the firing pin is in position to con-



HOW THREADED STUD is embedded into flange of H-beam. Female connectors are attached to studs to install pipe, cable or line hangers.





ADDITIONAL USES include hangers for stretcher and fire extinguishers (left) and a shooting line (right). Drilling the holes would require hours.

tact the cartridge primer. If the tool is dropped, the firing pin is automatically pulled away from the cartridge primer.

The firing pin is spring-impelled. To discharge the cartridge the safety arm is rotated and the tool is pushed forward against the material to be penetrated. As the tool is pushed, the barrel guard slips forward over the barrel and trips the firing pin mechanism.

Two interchangeable barrels are used with the tool. One is designed for %-in studs and the other for ¼-in studs. Various types of studs and powder loads are used, depend-

ing upon the type of material to be penetrated.

Although no flash is involved in the operation of the tool, its use underground is restricted to wellventilated areas, such as main haulageways. As an added safety measure, the atmospheres of locations in which the tool is to be used are checked with a methane detector.

Adaptation of this Velocity-Power driver to the many maintenance operations in mines has resulted in substantial dividends in time and has enabled maintenance crews to keep pace with mechanized-mining production.

American Mining Congress Convention Report



FUEL RESOURCES, PUBLIC RELATIONS—G. R. Southward (left), AMC; F. W. Earnest Jr., Anthracite Institute; J. E. Elkin, Coal Department, Duquesne Light Co.; Hon. J. C. O'Mahoney, U.S. Senate, Wyoming; Julian Conover, AMC; George Van Hagen, Peabody
Coal Co.; and Dr. C. J. Potter, Rochester & Pittsburgh Coal Co., session chairman.

AMC Coal Show Sets New High Mark

Unveiling New Machines and Equipment, Manufacturers Fill All Available Floor Space—Speakers Mark Coal's Advances and Scan Problems Ahead— Coal Men Measure Strength for War or Peace

THE 1951 COAL SHOW and concention of the American Mining Conress broke all records for attendance and set a new high in equipment dislays. Meeting in Cleveland, Ohio, for four days, May 14-17, the nearly 15, 100 coal men, manufacturers and representatives of related industries the registered saw machines and equipment, much of it new, that jammed the huge public auditorium. What they saw in the manufacturers' displays and what they heard in technical sessions were the reflection of a proud coal industry making itself stronger, through its own vision and effort, for whatever tasks the Nation may sak it to assume.

Opening what he described as the biggest coal show ever, Julian Conover, secretary, American Mining Congress, made a plea for adequate manpower, materials and equipment on behalf of the coal industry. With these needs filled, the coal industry can meet all military and civilian demands. Mr. Conover's statement was made at the first full session of the convention Monday afternoon, C. J. Potter, president, Rochester & Pittsburgh Coal Co., Indiana, Pa., and national chairman, AMC program committee, presiding. Dr. Potter called for formulation of a national fuels policy based not upon politics but upon need and sound economic principles.



MECHANICAL MINING—J. L. Hamilton (left), Island Creek Coal Co., session chairman; L. C. Spotta, Princess Elkhorn Coal Co.; E. F. Young, P. & R. C. & I. Co.; W. D. Hawley, E. G. & F. A.; Carel Robinson, Robinson & Robinson; W. I. Stonebraker, Hudson Coal Co.; Frank Eubanks, Old Ben Coal Corp.; and A. B. Crichton Jr., Johnstown Coal & Coke Co.

Markets and Goodwill

Unless private business takes over development of a synthetic liquid fuels industry, the government will move in, warned Hon. J. C. O'Mahoney, Senator from Wyoming and chairman, Senate Committee on Interior and Insular Affairs. War, if it comes, will take a heavy toll of our natural resources, including liquid fuels, and we will be forced to turn to shale and coal for new liquid-fuel supplies to keep our Nation strong.

Building up a synthetic-liquid-fuels industry will show the world that the United States is not imperialistic and that there is no end to human resourcefulness in a free capitalistic system. The way is being cleared for private capital to develop a synthetic-



CONTINUOUS MINING—H. A. Treadwell (left), C. W. & F. Coal Co.; M. F. Cunningham, Goodman Mfg. Co.; H. L. Thomas, Jeffrey Mfg. Co.; H. B. Wickey, Pennsylvania Coal & Coke Co.; M. H. Forester, Pittsburgh Consol, session chairman; A. L. Barrett, Joy Mfg. Co.; E. M. Arentzen, Lee-Norse Co.; Gerald von Stroh, MDC of BCR; and Davis Read, consulting engineer.

liquid-fuels industry by existing government - operated demonstration plants and by efforts to increase depletion allowances and modify present tax laws. Hydrogenation and gassynthesis plants, built at the mines, will help in the government's decentralization-of-industry program and will provide new sources of benzene, toluene and sulfur, he said.

will provide new sources of benzene, toluene and sulfur, he said.

Public relations begins at home, declared Frank W. Earnest Jr., president, Anthracite Institute. Showing how the anthracite industry carries out this doctrine, Mr. Earnest cited close liaison with newspapers and radio stations in the anthracite area; meetings with company and union officials and business people; participation in Community Chest and other civic enterprises; work with retail coal dealers and building interests through a staff of 30 field and consulting engineers; exhibits of burnsulting engineers; exhibits of burnsulting engineers; exhibits of burnsulting engineers; exhibits of burnsulting

ing equipment in cooperation with equipment manufacturers: operation of a testing and development laboratory; support of an extensive advertising program that employs television and newspapers; and cooperation with other industries and groups in support of mutual interests, such as opposition to unwise extension of natural-gas lines and the St. Lawrence seaway, and support of a sound tax program.

Even so, much remains to be done, Mr. Earnest said. The public still takes the coal industry for granted. To win favorable public opinion, the solid-fuels industry must spend a bigger part of its sales dollar for advertising and research and must shape up a large, well-planned industry-wide program, Mr. Earnest said.

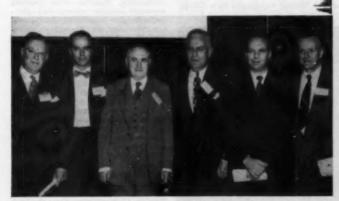
A survey of miner opinion before a company magazine is started is helpful in establishing policy and selecting material that will reach employees, said George Van Hagen, director of personnel, Peabody Coal Co., Chicago. The survey, which reached over 200 representative men selected at random, included questions on working conditions, employee opinion of the company, safety, production and union-company relations.

A contest among workers resulted in selection of Peabody People as the name for the magazine. From the start, the magazine, with a present circulation of 11,500, has aimed at building morale by giving recognition and information. Pages are filled with pictures and stories about and by miners, their families, their jobs and their company.

Peabody People gradually is correcting some situations that the original survey revealed, Mr. Van Hagen said. The survey showed that the miner felt (1) he was not informed about what his company was doing, (2) the public had a distorted impression of miners, (3) the company took its workers for granted, (4) misunderstandings could be avoided if problems and policies were explained to miners before major issues developed and (5) safety discussion was a "must."

The magazine now is aimed directly at the solution of these complaints. Over-all policy is two-fold: the magazine must remain a publication for the miners, never loaded with company personnel or propagands; and it must encourage rather than criticize, maintaining a positive attitude and stressing the constructive achievements of the miners. Results thus far have been increased interest and support from workers, based on improved communications leading to better understanding.

Interest in local affairs is a good way to create public goodwill, said J. E. Elkin, general superintendent, Coal Department, Duquesne Light Co., Pittsburgh. "Our company...and I be-



RESEARCH AND MOBILIZATION—Merle Newkirk (left), Dow Chemicel Co.; G. D. Creelman, M. A. Hanna Co.; Dr. A. A. Petter, BCR; L. C. Campbell, Eastern Gas & Fuel Associates, session chairman; Arnold Levy, Coel Defense Committee; and M. D. Cooper, Mining Engineering Education, NCA, and chairman, AMC floor committee.

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MAINTENANCE AND POWER—Seated: W. E. Wolfe (left), National Electric Coil Co.; K. L. Konnerth, Coal Division, U.S. Steel Co., session chairmen; William McGregor, Bell & Zoller Coal & Mining Co. Standing: F. K. Smith, Sunday Creek Coal Co.; J. B. Anderson,
The Texas Co.; Urban Toucher, Union Pacific Coal Co.; and J. Z. Linsenmeyer, Westinghouse Electric Corp.

ROOF SUPPORT (right)—J. K. Berry (left), Consolidation Coal Co. (Ky.); G. S. Jenkins, Bell & Zoller Coal & Mining Co., chairman; C. E. Hough, Imperial Smokeless Coal Co.; and James Westfield, Accident & Health Division, District VIII, U.S.B.M.



COAL PREPARATION—James Hannigan (left), Glen Alden Coal Co.; B. M. Bird, Jeffrey Mfg. Co.; F. P. Calhoun, Rochester & Pittsburgh Coal Co.; C. A. Gibbons, Susquehanna Cellieries Div., M. A. Hanna Co., session chairman; Devid Ingle Jr., Ingle Coal Corp.; W. C. McCuiloch, Roberts & Schaefer Co.; and D. R. Mitcholl, Pennsylvania State College.



SAFETY-Dr. A. J. Vorwald (left), Trudeau Foundation; I. N. Bayless, Unice Pacific Coal Co., session chairman; J. H. East Jr., USBM; G. C. Barnes, Virginia Polytechnic Institute; J. S. Whittaker, Pittsburgh Coal Co.; and Arthur Bradbury, Inland Steel Co.

lieve every other major coal-mining company—gives active support to those activities designed to make their mining communities a better place in wheh to live." These activities are supported because the managements realize that they have obligations to their communities and because they want to make their communities better places to live in. Duquesne officials are encouraged to enter actively into worthwhile community projects, but the company is careful not to initiate or dominate any project.

Community projects in which Duquesne Light Co. and its officials participate include the following, Mr. Elkin reported: Brownie groups and Boy and Girl Scouts, together with a day camp that also is used by church and civic groups for picnics and other outings; first-aid training for Scouts and adult citizens of the community, together with first-aid contests; outdoor sports and playgrounds; church projects; the Greens-boro-Monongahela Township Volunteer Fire Department and the community hall; the women's civic club as well as men's service clubs; highschool classes in coal mining and extension classes for workers who aspire to be foremen; and a company hospital that serves the community as well.

The results of Duquesne's community-sharing program are as follows, Mr. Elkin said: (1) better public relations at home and abroad; (2) realization by workers that the company is interested in the community, resulting in greater loyalty between men and company and a stronger official organization; and (3) an opportunity for the company's men to grow and develop their abilities through work with community activities, thus opening the way for promotion within the company.

The Nation is in the midst of a





STRIP MINING—Left photo: C. E. Compton (left), Grafton Coal Co.; T. G. Gerow, West Virginia Coal & Coke Co., session chairman; D. M. Bondurent, West Virginia University; and H. C. Kirtland, Allison Division, General Motors Corp. Right photo: R. Y. Williams (left), consulting engineer and session chairman; R. L. Akre, Maumee Collieries Corp.; T. H. Lettimer, United Electric Coal Cos.; W. J. Crawford, Enos Coal Mining Co.; D. D. Saxton, Hanna Coal Co.; Russell Badgett Jr., Badgett Mine Stripping Corp.; and R. H. Swallow, Ayrshire Collieries Corp., presiding.

fuels revolution, declared Arnold Levy, counsel, Coal Defense Committee, Washington, D. C. Mr. Levy was the opening speaker at the final session Thursday morning, L. C. Campbell, vice president, Eastern Gas & Fuel Associates, Pittsburgh, presiding.

The immediae problems ahead of the coal industry—transportation, materials and manpower—can be solved with energy and perseverance but there are long-range problems that will demand study and vision, Mr. Levy contended. Some of these long-range problems are: (1) how to maintain the small-unit pattern of the coal industry without hindering needed developments; (2) how to merge the skills and resources of producers and the mineworkers' union in educating government and the public in the dependability of coal; and (3) how to evolve a national fuels policy that is realistic but incurs no risks.

The latest wage adjustment, negotiated without noise or stoppage, was a big step in showing the public and government that coal is dependable, Mr. Levy said. With strong economists and effective spokesmen, coal will have a better chance of developing a sound policy for discovery and development and obtaining fair treatment in depletion allowances, freight rates and oil imports.

Research in coal production and utilization, plus follow-through in making known the results of research, will assure the Nation of an effective and prosperous coal industry to serve the national welfare and security, said Dr. A. A. Potter, president, Bituminous Coal Research, Inc., and dean of engineering, Purdue University, Lafayette, Ind.

The three-phase program of BCR includes a general research program, the development of a coal-burning gas-turbine locomotive and the improvement of continuous a mining

methods and equipment, Dr. Potter explained. In pursuit of this program, BCR expects by the end of 1951 to have available for commercial production an efficient and smokeless stove, a magazine warm-air furnace. a heating boiler with magazine feeding and a down-jet coal range with close temperature control. By that time, also, an automatic household stoker with bin feed and mechanical ash disposal will be ready for field testing. In addition to these expected developments, BCR recently has extended its basic knowledge of mine drainage; smokeless burning in small stationary power plants, locomotives and marine service; and coking and gasification of coal. In the year ahead, a study will be made of block heating.

Further Research Urgent

Areas in which further research is needed include the following, Dr. Potter said: coal utilization, especially in the electric-utility industry. which probably will burn coal at an annual rate of 240,000,000 tons by 1965; summer cooling, with its increased electrical load; liquefaction, gasification, by-product coking and chemical treatments of coal; chemicals, drugs and fertilizers using coal as a raw material; gas production; mine drainage, gob piles and refuse disposal; metallurgical uses; coal preparation, especially recovery, treatment and utilization of fines; coal transportation by rail, barge, truck, belt and pipeline; a "package" power plant; farm uses for coal; conversion of oil-fired equipment to coal; and basic theoretical problems.

These are urgent problems, affecting the industry and national security, and they should have the full support of the industry, Dr. Potter stated. The coal industry, he pointed out, probably spends less than 0.1% of its gross income for research and

promotion of the products of research, against expenditures of 0.5 to 4% of gross receipts by other progressive industries.

Steam locomotive efficiency has improved 35% in freight service and 15% in passenger service in the last 30 yz, said G. D. Creelman, director of research, M. A. Hanna Coal Co., Cleveland. Wider use of prepared coals will bring still further improvements without equipment changes, as has been shown by a 20% saving in fuel costs when double-screened coal was used. Further improvementa in railroad-fuel utilization have resulted from control of cinder emission and the application of overfire air jets to prevent smoke.

Producer gas made from coal, if properly cleaned, would make a good fuel for diesel engines and gas turbines, Mr. Creelman declared. To this end, diesel and gas-turbine manufacturers are supporting a BCR project aimed at designing a satisfactory gas producer. A joint study also is under way in railroad electrification.

The Locomotive Development Committee, BCR, is reporting steady progress in building and testing a coal-fired gas-turbine power plant for locomotive and stationary-plant use, Mr. Creelman said. Major problems of pulverising, feeding, combustion and fly-ash removal have been solved and test-stand studies now are being made, the experimental gas turbine having recently concluded its fourth series of 250-hr tests. This radically new locomotive, together with steamlocomotive improvements possible through engineering, maintenance and fuel advances, and with the possibility of further electrification, may well give the diesel real competition and bring an increase in coal's railroad market, he concluded.

Burning coal dust in suspension has produced new high furnace tempera-

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tures through more complete com bustion of coal particles, said Merle Newkirk, power manager, Dow Chemical Co., Midland, Mich. Pointing out that the cyclone furnace burns coal completely with a minimum of excess air, precipitates ash in minimum space develops high efficiency, Mr. Newkirk described construction and operation of his company's new South plant, where coal is crushed to the desired size and dried before being fired in the cyclone burners.

To feed crushed coal into the pressure area where it is burned, a rotary star seal has proved most effective. The burners are fed with a stream of crushed coal and air blown tangentially into the cylinder, which is inclined slightly above the horizontal. Ignition is achieved by a gas or oil torch. The gases spiraling around the combustion cylinder throw the ash particles against the cylinder wall, where they stick to the liquid slag. The slag drains down the slope onto the floor, whence it is drained by stages into a water-filled ash pit.

The furnace operates under pres-sure, Mr. Newkirk explained. Tubes in the primary and secondary sections, as well as the screen tubes, are fully studded and packed with raw chrome ore. During operation, the screen tubes are coated with molten slag, which catches the small dust

and fly-ash particles.

Outstanding features of the newtype plant include the following, Mr. Newkirk reported: elimination of objectionable fly ash, minimum of excess air, efficient control, simple distribution of air, burning efficiencies exceeding 90.5%, carbon loss of only 1% and design of the boilers for chemical cleaning.

Continuous Mining

Improvements recently made in continuous mining machines and auxiliary equipment, announcement and description of new units, coordination of auxiliary operations, and a report of efficient slope driving with a continuous machine were subjects of a Wednesday afternoon technical session presided over by M. H. Forester. vice president-operations, Pittsburgh Consolidation Coal Co., Pittsburgh, Pa., with Davis Read, consulting engineer, Madisonville, Ky., co-chairman.

Participants in a panel discussion of machines and methods were: Gerald Von Stroh, director, Mining Development Committee, Bituminous Coal Research, Huntington, W. Va.: Coal Research, Huntington, W. Va.; A. Lee Barrett, development engineer, Joy Mfg. Co., Franklin, Pa.; M. F. Cunningham, vice president, Good-man Mfg. Co., Chicago; E. M. Arent-zen, president, Lee-Norse Co., Char-lerol, Pa.; and W. J. Phillips, assist-ant to the president Sunnyhill Coal ant to the president, Sunnyhill Coal Co., Pittsburgh. Mr. Phillips' paper was presented by H. L. Thomas, Jef-

frey Mfg. Co., Columbus, Ohio.

An explanation of the cycling of auxiliary operations was given by T. L. Aitken, vice president-operations, Ebensburg Coal Co., Colver. Pa., and H. B. Wickey, vice president operations, Pennsylvania Coal &

Coke Co., Cresson, Pa.
H. A. Treadwell, vice president,
Chicago, Wilmington & Franklin Coal Co., Chicago, described the application of McKinlay entry-drivers to the job of driving rock slopes to open a

Continuous mining is a complex system for recovering coal and not merely a machine, Mr. Von Stroh said in keynoting the afternoon's proceedings. Listing some of the changes that might reasonably be expected as a result of continuous-mining development, Mr. Von Stroh reported that a pair of machines at their present state of development theoretically

can produce 1,640 tons per day when the accompanying problems are ultimately solved; that mine projections probably will be modified to permit full realization of the productive potential of continuous machines; and that getting realization in the shortest possible time will require substantial improvements in illumination, ventilation, supplyhandling and so on.

Using slides to trace recent development of mining aids, Mr. Von Stroh described an automatic boom point at a mine of the Consolidation Coal Co. (Ky.). At this installation, when a car is loaded the belt automatically stops, and, after sufficient time has elapsed for the belt to stop the cars are shifted automatically. When the empty is in position the belt starts and the cars are shifted automatically as loading proceeds. This automatic boom point requires electrical relays and timers unheard of in any industry only a short time ago, Mr. Von Stroh declared.

Other developments are the portable laboratory, which is an industrysponsored continuous machine; an extensible shaker-conveyor using a strip of steel as a pan line, and a new cutter bit especially designed for rotary-

type machines.

Recent improvements now standard n Joy machines were reported as

follows by Mr. Barrett:

1. New models provide for greater convenience in making operating adjustments, more accessibility throughout the machines and more troublefree operation through changes in hydraulic systems.

2. Design of the ripper bar has been modified to eliminate cutting chains and attendant bit problems, thus increasing bit life approximately 6 to 8 times over previous methods.

3. A high-velocity spray of foam improves dust-allaying while cutting water consumption.

4. A new extensible belt conveyor with mobile head and tail pulleys will permit continuous transportation behind the continuous mining ma-

The Goodman mining and loading machine was described by Mr. Cunningham as consisting of a gathering and loading head similar to the Goodman loading machine with an added feature-the 31/2-ft-wide mining head carrying five cutting disks with eight bits on each and 10 cone-shaped roller wedges between the disks. The mining head sumps in at the roof and cuts downward, with 50% of the mining accomplished by cutting and 50% by wedging. Each cut is 42 in wide and 18 in deep. The machine has six motors, totaling 180% hp.

In building the first machine, it was attempted to design into it six important functions, Mr. Cunningham said. They are: flexibility, high capacity, ability to produce coarse coal, ability to load all coal mined, production of a minimum of dust, and low maintenance. Success has been achieved on some points and further refinements will result in improvement on

others.

The Goodman machine will turn 12ft-wide crosscuts at 90 deg from a 12-ft-wide entry; a capacity of 1% tpm has been attained in tests and refinements may raise this to 2 tpm; 30% of the coal produced is minus 14-in but other mining heads will be tried to improve size consist; the loading head gathers almost all coal removed from the face; dust has not been excessive; and maintenance difficulties will be thoroughly investigated, Mr. Cunningham reported.

The Goodman company feels that so-called continuous-mining machines will have a definite place in coal mining, but we are equally convinced that conventional mining equipment will continue to hold a dominant position in the mining of coal for a long time to come," Mr. Cunningham concluded.

The Lee-Norse Koal-Master, Mr. Arentzen said, embodies a new principle in that the mining head continually cuts diagonal intersecting kerfs, thus developing diamond-shaped projections in the coal face which are easily broken off by the action of the tools as the machine advances. For a more complete description, see pp. 94-95 of this issue.

The low-seam Colmol, said Mr. Phillips, has achieved a maximum production of 255 tons in 51/2 hr at the face while actually working 41.6% of the time. He described the machine and the new Molveyor, a train of short connected conveyors for intermediate transportation from the Colmol to the mother belt. A full description of the Molveyor appears in Coal Age, May, 1951.

"It is apparent that the terms 'continuous mining' and 'continuous transportation' are synonymous," Mr. Wickey declared, "and it is equally apparent that efficient performance of the machine requires complete in-

tegration of all factors which enter into the cycle of mining operations.' In pointing out the impact of continuous methods, Messrs. Wickey and Aitken recommended careful consideration of 11 elements of mining, as follows:

New Machines Pose New Needs

1. Maintenance-Sound training of mine maintenance men is necessary. with responsibility shared by all parties from manufacturer to mine su-

2. Ventilation-An upward revision of minimum quantities, from the present 6,000 cfm to 8,000 or 10,000 cfm, may be necessary to properly ventilate and de-dust the face area.

3. Roof Support-Where crossbars required, either timbering or production suffers, invariably the latter. Therefore, roof-bolting must be expanded and tools and methods must be developed to permit bolting to keep pace with the advance of the continuous machine.

Supply-Off-shift supply-handling or delivery trucks appear to be necessary, since extensible transportation units now being developed are

not reversible.

Communications-Trolleyphones and telephones at each loading point are necessary to keep haulage and

loading coordinated.

6. Rock Handling-It may be necessary to keep a conventional loading machine and perhaps a cutting ma chine in the section to take care of emergencies that continuous machines cannot handle.

Drainage-Strict engineering with regard to mine layout should be the rule to permit mining-to-the-rise

as much as possible.

8. Power—Proper voltage must be maintained because of the bad effects of low voltage not only on machines but also on production.

9. Transportation-Time studies indicate that about 60% of the nonproductive time at the face is attributable to transportation. Several methods now have been developed to eliminate this bottleneck.

10. Mining Methods-It appears that conventional room-and-pillar systems are obsolete in continuous mining. Continuous machines with proper auxiliaries should not be limited to 300 ft because the longer the time a machine can be used in advance the more efficient the operation becomes.

11. Supervision-Today's mine suervisors must have a broad and detailed knowledge that includes huner relations as well as technical skills

Problems and benefits of drivin, rock slopes with McKinlay entrydrivers at Orient No. 3 mine, Chicago, Wilmington & Franklin Coal Co., Waltonville, Ill., were described by Mr. Treadwell in closing the continuous-mining session.

Twin slopes were driven on a 16deg dip through 800 ft of cover, with the McKinlay machines used in various shale formations after harder formations had been penetrated by conventional methods. However, 72.6% of slope length was driven by the Mc-Kinlay machines. In the period from Jan. 22 to June 14, 1949, average advance was 15.4 ft per day, using track haulage to remove material.

The two machines used for this work were rebuilt to permit them to work on the steep dip. The frames were turned over and the conveyors mounted through the bottom of the machine to reduce the conveyor angle.

The two slopes are 12x7 ft in crosssection and, since strata were not disturbed by blasting, the problem of roof control was not critical. A flash of Gunite was applied while slopedriving progressed to prevent weathering, and the finished slope is lined with a 2-in coat of Gunite reinforced with 4x4-in steel mesh.

Among the benefits derived from the use of the McKinlay machines are (1) rapid advance, (2) low cost, (8) arched roof and rib for increased stability, (4) excellent roof-control and (5) specified clearances with a minimum of excavation, Mr. Treadwell

Mechanical Mining

Bridge conveyors have made it possible to keep loading machines busy over 50% of the time and to mine 111,000 tons of coal at an average of 84%c per ton face cost in 30- to 55-in coal at Crichton No. 4 mine in Nicholas County, W. Va., said A. B. Crichton Jr., vice president, Johnstown Coal & Coke Co. Mr. Crichton was the first speaker at the Wednesday morning session on mechanical mining, J. L. Hamilton, vice president, Island Creek Coal Co., Huntington, W. Va., presiding.

Emphasis at Crichton No. 4 is placed on high tonnage per man rather than per section, Mr. Crichton remarked. The big problem is maintaining the 65% of coarse coal (over %-in) achieved by air shooting and mobile loaders. While not discounting the progress made by continuous mining machines, the company has found the bridge conveyor the best solution for "mining merchantable coal at a

Crichton No. 4 mine is operated with 440-v AC underground. Transportation from mining sections to tipple is by belt conveyors, there being 15 in use. Shuttle cars are used only on development and the surge is absorbed by shaker feeders to the belts. With the bridge conveyor system used in wide work, the mobile loaders need less maintenance than when they had long booms, Mr. Crichton said.

Discussing Mr. Crichton's paper,

Carel Robinson, Robinson & Robinson, consulting engineers, said his firm considers the bridge conveyor almost as revolutionary as trackless mining was when first introduced. He stressed the help of the bridge conveyor in driving breakthroughs and rooms up to 40 ft in width, and cited the maneuverability of the short-tailed loader. He suggested that two chain conveyors be used per room and that the machine be switched from one to the other as a means of reducing the down time f a continuous miner served by a bridge conveyor and requiring exconsions of the room conveyor.

New loading machines and shuttle cars produced a 49% increase in tonnage and a 22% decrease in cost when they displaced shaker conveyors in the 30- to 38-in coal of the David mine, Princess Elkhorn Coal Co., David, Ky., said Irvin C. Spotte, general superintendent of the company. The new loading machines are Joy 20-BUs and the shuttle cars are Joy SC-2s. The machines, of 5-tpm capacity, are only 24 in high. The shuttle cars are 26 in high, 23 1/2 ft long, 9 1/4 ft wide and 80 cu ft level capacity. They have 4-wheel drive and steer, airplane-type brakes, hydraulically driven cable reels and elevating con-veyors that dump directly into mine PRES.

Down Time Reduced

Loading time lost because of me chanical and electrical failures of the new shuttle cars has been only 0.76% of available production time. The new loading machines have lost only 11.1% of production time. Conveyor-chain troubles arising principally from lack of clearance for lumps between boom and roof may be corrected by a thinner boom, and a different tramming clutch may improve the machine's maneuverability, Mr. Spotte said.

Develorment methods in a low-coal mine in which in the last 4 yr 271,585 tons of slate from grading operations was handled and 1,593,237 tons of coal was produced were described by W. D. Hawley, general superintendent, Eastern Gas & Fuel Associates, Glen White, W. Va. The 30- to 42-in bed has severe undulations up to 11% grades on approximately 1,000-ft

centers.

As far as possible, the grading is done by taking bottom to avoid disturbing the weak sandy-shale roof, which falls vertically 1% ft for each foot of width disturbed. In lifts of about 320 ft, the bottom grading is done by drilling with shop-made drifters of single and multiple type, shooting with Gelobel AA and loading with Joy scraper loaders and Whaley mobile units. Roof bolting, using light channel crossbars, has greatly expedited rock development by reducing the idle time of the rock-loading units, Mr. Hawley reported.

Discussing Mr. Hawley's paper, C. W. Thompson, Weirton Mines Corp. Isabella, Pa., said that somewhat the

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same conditions obtain at Weirton mine, near Morgantown, W. Va. In the 42-in seam development, the coal is mined about 3,000 ft ahead so that a profile can be laid out for the grading. In taking bottom, a machine drills six holes at a time. A 500-ft traveling belt conveyor that can load 20 mine cars at a time is hung from roof boits.

A new shaker loader, called the Duckling" and developed by Good-"Duckling" man Mfg. Co., has been installed in the Maple Hill mine, Philadelphia & Reading Coal & Iron Co., said Elmer F. Young, mining engineer. At work since December, 1950, the loader is advancing a pillar hole 4.7 ft more per day and is producing 12.3 net tons more coal than an adjoining pillar being worked with conventional handloading onto a shaker. The complete assembly was taken up a 35-deg rock hole 105 ft long and installed in a topsplit pillar chute by three men in two days at a labor cost of \$76.74. Mr. Young reviewed the mining conditions and the various experiments and practices in mechanical mining in the Western Middle and Southern anthracite fields

The "Duckling" shaker-loader has increased performance 23% over formor handloading onto a shaker at mines of The Hudson Coal Co., Olyphant, Pa., according to W. I. Stonebraker, colliery superintendent. Two men are employed with the machine on each of two shifts per day. The machine is advancing a narrow face 250 ft from a tunnel between two coal beds to a point where a rock hole can be driven for the return air course.

A recent application of the "Duckling," used in conjunction with a lightweight crosseut drive with hydraulic jack, has been in drawing pillars in a seam consisting of 16- and 30-in benches of coal separated by 20 in of bone and rock. No conclusion as to the machine's adaptability for this application has yet been reached beyond the fact that the workmen approve the lighter weight of the machine.

In Olyphant Colliery, a Joy loader recently was put to use to clean a gangway and air course driven along the strike in opening a section of an upper bed that was first-mined 75 yr ago. In cleaning up caves 4 to 14 ft thick, the loader advances three times as fast as the former handloading into mine cars. Special timbering machines built in the colliery shop are used for standing heavy timber for roof support. An adjustable-position seat on the timbering-machine boom accommodates the workman who keys the timber. Mr. Stonebraker added.

tinuous miner and the main watergathering pumps get some of their lubrication off-shift.

Oils and greases sent into the mine are packed in 3-, 5- or 10-gal containers with special identifying colors and with the type marked on each container. Enough cans are on hand to permit sending full cans in immediately before the end of the first shift. Empty cans are gathered by the motormen and rope riders and are sent out of the mine at the same time.

Lubrication Made Easier

Lubrication problems can be greatly simplified by engaging a lubricating engineer from one of the oil companies to make a survey and by requiring the master mechanic and operating personnel to report their problems and experiences, Mr. Murray said.

Sealed fully automatic lubricating systems have become standard equipment on all loaders and shuttle cars in mines of the Clinchfield Coal Corp., said L. W. Deutsch, Trabon Engineering Co., Cleveland. The installations were made following a 90-day trial on one loading machine and one shuttle car in 1949.

On the shuttle cars, the oil pump is operated from the hydraulic system. With each 20 turns of the steering wheel in either direction, the 60 to 70 points of the car are lubricated completely. Reducers and drive units are kept completely filled with grease to seal out mud and water. No undue heating has occurred. One unit, when torn down for inspection after 7½ mo and 2,000 hr of actual operation, was found to be in perfect condition. The shuttle cars lubricated by the Trabon system are using only 1 to 1½ lb of grease per 100 tons of coal

A lime soap grease from a highly refined medium - heavy - viscosity straight mineral oil has been found most satisfactory as a single grease for all parts of a shuttle car lubricated by the central automatic system, said J. B. Anderson, supervising engineer, The Texas Co., Huntington, W. Va. Shuttle-car housings are kept completely full. Upon inspection, grease that had been in the housings of the Clinchfield Coal Co.'s shuttle cars for 7½ mo still was suitable for service although it showed slight softening and slight oxidation. Not one bearing failure has occurred in the Clinchfield shuttle cars acquipped with the automatic centralized system.

hauled.

AC power systems have several advantages over DC systems, according to J. Z. Linsenmeyer and A. G. Owen, Westinghouse Electric Corp. The joint-ly prepared paper, presented by Mr. Linsenmeyer, gave a comprehensive comparison of AC and DC systems for underground use, discussing relative efficiencies, weights and other characteristics of rectifier substations and transformer substations; voltage regulation; motor characteristics; and control designs and performances. Although seven states limit underground

Power and Maintenance

Planned maintenance is taking hold as the answer to the over-all maintenance problem, said W. E. Wolfe, plant superintendent, National Electric Coal Co., Bluefield, W. Va. Mr. Wolfe led off at the Tuesday morning session on maintenance and power, K. L. Konnerth, vice president, Coal Division, U. S. Steel Co., Pittsburgh, presiding. Of the three types of maintenance—ordinary, preventive and planned—it is time the first should be written off and the second, consisting of inspections, minor repairs and adjustments, should be made an adjunct to the third. Mr. Wolfe declared.

Points to be observed in a planned maintenance program are: (1) decide ahead of time how and where the work will be done; (2) give prior consideration to units absolutely essential to continuous production; (3) weigh costs of delay against costs of spare or component units; (4) based on importance to production and probable life of components, pre-schedule inspections, repairs and overhaul; (5) provide special skills for the various types of work; (6) keep performance records; and (7) "plan the work and work the plan."

Though the skeleton of most old equipment is strong and elastic enough to withstand the effects of time and work, the vital organs must be renewed or repaired on a schedule determined by experience or time of service. With modern insulation, wiring can be made as good as new, or better. The greatest opportunity for

reduced maintenance and trouble-free operation lies in the control, or "nervous," system of equipment, he said.

Duties of maintenance workmen at Oriole mine, Bell & Zoller Coal & Mining Co., were outlined in a paper by William McGregor, chief electrician, Madisonville, Ky. Nine men comprise the outside shop force and two men rated as electricians handle electrical inspection and maintenance for the preparation plant and DC generator equipment. Emergency underground repairs on the six loading machines and supporting equipment are handled by four men on each of the two operating shifts.

An evening crew takes advantage of the hour between shifts to make certain repairs ready for the night shift. Six of the third-shift maintenance crew start work 2 hr before the production shift ends and thus relieve the evening-shift repairmen. An invaluable and recent addition to the third-shift maintenance crew is a spe cialist on inspection and repair of all motors and controllers. "The cost of delays to mining machinery ranks first but the cost of preventing possible delays should receive close scrutiny in any maintenance organization," Mr. McGregor concluded.

Twelve principal lubricants used by Union Pacific Coal Co. were described by V. O. Murray, general manager, in a paper read by Urban Toucher, chief electrician. Nearly all the lubricants are handled on shift, though Joy loaders, top cutters, shuttle cars, a con-

power to 300 v or less, the AMC Underground Power Committee feels that advantageous use of AC underground will require 400 v on face

equipment.

Several principal advantages of AC systems were cited: (1) constant speed practically independent of voltage variations; (2) simpler motor construction and less maintenance; (3) greater conversion efficiency; (4) easier substation moving, permitting operators to keep the conversion equipment closer to the face; and (5) lower cost. The major disadvantages are: (1) torque drops as the square of the voltage; (2) AC contactors drop out on a relatively small reduction in voltage; and (3) power factor introduces complications. There now are enough AC systems in use to establish underground use of AC. Mr. Linsenmeyer concluded.

Higher AC voltages are safer than lower DC voltages with open trolley wires, said M. K. Clay, Gulf Mining Co., Mt. Hope, W. Va., who discussed Mr. Linsenmeyer's paper. Mr. Clay expressed disagreement on two points: (1) the lighter weight of AC substations is not likely to result in more frequent moves toward the face, since substations are seldom moved until voltage drops low at the face; (2) DC controls stand up as well as AC controls, or better.

& Health Division, Region VIII, U. S. Bureau of Mines. Samples from 51 mines in Region VIII show that the free-silica content of roof strata drilled for roof-bolting averages 31%. Workmen in return air from roof drilling are exposed to dangerously high concentrations of silica-bearing dusts, yet in 71% of the roof-bolted mines, no dust-control is used.

Properly operated, wet pneumatic drilling reduces dust concentrations to tolerance or below, but such drilling sometimes weakens the roof and floor. For this reason, the Bureau has begun a testing program for dust collectors. Thus far, the principles incorporated in conventional dust collectors appear to be adequate for coal mining. The Bureau has asked the Joint Industry Safety Committee to revise the Federal Mine Safety Code to permit use of dry dust collectors in roof drilling. Once dust collectors are adapted to roof-bolting, they may be applied also to other rock-drilling operations, Mr.

Westfield pointed out.

A coal drill and timbering machine, made by Joy Mfg. Co. and installed in May, 1949, has sped operations in the 8- to 9-ft coal seam in Renton No. 3 mine, Pittsburgh Coal Co., Renton, Pa., reported Clarence M. Hays, division engineer of the company. To promote design of the machine, Pitts-burgh Coal Co. called in A. L. Lee. consulting engineer. Investigations produced a timber-setting anddle mounted on a fully-encased 10-ft auger on the boom of the machine. All holes within reach of the boom are drilled from a single set-up.

Hydraulic pressure pre-loads the drill against the face before drilling is started. The hydraulic drive of feed and rotation compensates for harder or softer drilling conditions. The machine also includes a hydraulically driven saw. No handling of sectional augers is necessary, the auger is never exposed, stamping or centering of holes is eliminated, and the heavy labor of sawing and setting posts and timbers is avoided. Driller and timberman are not exposed to doubtful roof,

Mr. Hays pointed out.

Roof Support

A roof-bolting machine using an old rubber-tired boom-equipped timbering machine as a chassis and hydraulic power for rotary drill and controls has been built by Consolidation Coal Co. (Ky.), said John K. Berry, production engineer of that company. Mr. Berry's paper was the first at the Tuesday afternoon session on roof support.

Wet drilling (Coal Age, May, 1951) completely suppresses dust and brings big savings in drill bits, Mr. Berry said. A bell-shaped female shank on the hollow drill steel and a male chuck on the drill form a seal against a gasket to conduct water from a water swivel. Automatic and positive water application is handled by the lever that starts the drill rotating. The design fits mining conditions and roofbolting is no longer a bottleneck.

Experimental portable roof-bolt drills are being designed and tried out in the 30- to 40-in coal of No. 3 mine, Imperial Smokeless Coal Co., Nicholas County, W. Va., according to C. E. Hough, vice president of the company. The machines now in use, with three rubber-tired wheels and power tramming, have been operating three shifts per day with negligible electrical-mechanical failures. They have pointed the way to changes that the machine manufacturer is incorporating in his latest machines for lowcoal work. These changes are as follows: (1) hydraulic auger drive with nut tightener; (2) maximum feed range increased from 18 to 26 in; (3) provision for wet drilling; (4) creased height of auger socket above bottom; and (5) hydraulic steering.

Practice in the No. 3 mine is to use a two-man crew, %-in bolts 30 in long with expansion-type anchors, and 5x5x%-in plates. Bolt spacing is 6 ft each way. Bolts are tightened by a ratchet wrench and tested by a torque wrench for a minimum of 175 lb. A crew drills for and installs 10 to 12 bolts per hour when working two or adjacent places, Mr. Hough stated

same mine were found in the course

Wide roof variations in a single seam and variations even within the of a study of many coal seams in the Appalachian region, declared A. T. Cross, coal geologist, West Virginia Geological Survey. Mr. Cross presented a paper prepared jointly with Paul H. Price, West Virginia state geologist. The sandstones, limestones, shales and clays were observed in relation to roof action and the probable success or failure of roof-bolting. To insure best results from roof-bolting, the authors urged constant attention to changing conditions, open-mindedness to revised methods, maintenance of high-quality workmanship, and appreciation of geologic phenomena.

Small rubber-tired drill stands, built in the company shop at a cost of \$75 for material and \$100 for labor, exclusive of the drill itself, are drilling about 1 fpm, enabling a two-man crew to drill for and install 10 roof bolts per hour, said E. H. Greenwald, assistant general manager, Boone County Coal Corp., Sharples, W. Va. These drills, made especially for low coal, are filling in a gap left by manufacturers, Mr. Greenwald added.

Roof bolts are supporting 63,000,000 sq ft of roof area in 353 coal mines in the eight major coal-producing states east of the Mississippi, said James Westfield, chief, Accident Prevention

Stripping **Progress**

Newly designed drills for stripping operations indicate that drilling machines soon will catch up with progress in dragline and shovel design, said W. J. Crawford, vice president, The Enos Coal Mining Co., Oakland City, Ind. Mr. Crawford was the first speaker at the Tuesday afternoon stripping session, R. H. Swallow, chief engineer, Ayrshire Collieries Corp.,

Indianapolis, Ind., presiding.

Describing the diversified overburden at Enos properties, Mr. Crawford stated that cover in the two pits averages from 50 to 60 ft, including slate, shale, limestone, red sandrock and topsoil. Two 36-yd shovels remove the overburden. The stripping territories are cross-sectioned every 100 ft, permitting the engineers to make a daily check-up of shovel productivity.

In banks up to 45 or 50 ft, horizontal drilling usually is adequate, with holes drilled 50 ft deep on 20-ft centers. A company-built gas-driven drill and a Joy Stripborer are used. In banks where horizontal holes are inadequate, vertical holes also are driven, chiefly by three dry-auger electric rotary drills built in the Enos shops.

Prior to the purchase of two Joy Heavyweight Champion drills (Coal Age, February, 1951) vertical drilling in banks with hard sand or lime boulders was done by churn drills. The two Joy drills, using air to clean the

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holes, increase drilling speed, eliminate the need for water and lengthen bit life, Mr. Crawford said. Bit cost averages 2 to 2.5c per foot; total drilling cost per foot for direct mining operations, 16c. Drilling averages over

53 ft per hour.

Liquid oxygen, used for shooting the overburden, is manufactured at the Enos plant, where capacity recently has been tripled, Mr. Crawford reported. The LOX produced in this plant is 90% pure and is unique in that both absorbent and cartridge bags are fireproofed. Approximately 21 lb of LOX is used per cartridge shot. Cost of this treated explosive is about 60% of the cost of ordinary stripping explosives. The safety factor is high and the explosive qualities are good, with 75 to 101 cu yd of overburden being shot per cartridge.

Commenting on Mr. Crawford's paper, R. M. Goolsbay, Hughes Tool Co., traced development of the three-cone dry rotary bit and explained the pressures required in various types of

overburden.

Selective-elevation horizontal drilling of overburden results in preparation of the maximum quantity of cover with minimum drill holes and minimum explosive, said Donald D. Saxton, superintendent of stripping operations, Hanna Coal Co., Adena, Ohio. Successful application of selective-elevation drilling depends on careful studies of the stratigraphy, he pointed out.

Adapting Drills to New Needs

Tracing successive stages in development of a machine that would enable drillers to drill at any selected height, Mr. Saxton showed how two Bucyrus-Erie drills, a 29-T and a 42-T, were adapted to the company's needs. One major stage in development was reached when a steel frame was erected on the 29-T to support three sidewall drills arranged in an isosceles-triangle pattern.

At the particular place where the drill then was working, the overburden structure was such that two horizontal holes could be drilled near the rider seam while one was being drilled in the bluestone immediately above the coal. The triangular arrangement permitted the two drills at the base of the triangle to drill one hole each simultaneously. Meanwhile, the single drill at the apex drilled two holes, both starting from the same point in the highwall but angled 45 deg from the face.

The present drill mounting, evolved through succeeding stages, was designed to meet changes in overburden stratigraphy, Mr. Saxton explained. With an increase in the time required to drill the top holes, the triangular drilling pattern was replaced with two parallel rows of staggered holes, the lower row being drilled in the bluestone 5 to 6 ft above the coal and the upper row 20 to 25 ft above the coal, near the rider seam.

One of the lower drill platforms was

removed. The lower platform now remaining is attached to a vertical channel and is raised or lowered to the desired elevation by means of cable. The other platform, formerly the upper, is mounted on an inclined plane and is moved up and down by cable. This second platform also can be moved horizontally toward the face a distance of 7½ ft. The present unit is 35 ft high, 45 ft long, and 60,000 lb in weight.

The overburden stratigraphy determines whether one or two rows of holes must be drilled. Mr. Saxton said. A crew of two men using one drill is needed when one row is required; when two rows are needed, four men are assigned to the drilling crew. A drilling and blasting crew of this latter type can prepare approximately 15,600 ft of holes in 1,310 manhours each month. Where overburden height exceeds the practical limit of the sidewall drill or where percussion must be subdued, vertical holes also are drilled. For these holes, Hanna uses a Joy rotary air-cleaning vertical drill.

Other recent drilling developments, including a description of three different drilling machines, were discussed by Gene H. Utterback, chief engineer, United Electric Coal Cos., Chicago. In the absence of the author, his paper was presented by T. H. Lattimer, engineer for the same company.

The first machine described by Mr. Utterback was designed to drill the limestone ledge between the No. 11 and No. 12 seams at the Homestead mine, Sinclair Coal Co., in West Kentucky. However, it should be equally satisfactory, he added, wherever compressed-air drilling of small-diameter holes is needed. The machine uses a Jaeger Model 600 air compressor, delivering 550 cfm of air at 100-lb pressure to two conventional 4-in drifter drills. The compressor and all its parts, as well as the drill-support frames, are mounted on a Caterpillar D-8 tractor, all bolting being done to standard Caterpillar drill holes. The drill-support frames are movable, permitting fast spacing of holes, and can be kept vertical to the tractor frame by adjustable braces. Long-boom drifter drills permit use of long starting steels up to 16 ft. or more. Three men run the machine and production averages 250 ft per hour.

The second machine was designed to drill andstone over the No. 12 seam in West Kentucky. A pantagraph arrangement makes the boom point travel in a nearly vertical straight line. Ward-Leonard controls on the electrical equipment provide variable speed on the drilling head—high apeeds at light load and slow speeds with high torque at heavy loads. The drill averages 34.3 ft per hour.

The third machine was designed to handle a top stratum of limestone and intervening layers of mud and sand at the Fidelity mine, United Electric Coal Cos., DuQuoin, Ill. This machine, built by Reich Bros. Mfg. Co., Terre Haute, Ind., provides a 48ft continuous stroke with an auger spiral welded on the outside of a 5¼-in flush O.D. drill stem.

Addition of water through the drill stem at 120 gpm and 300 lb pressure has made it possible to drill a 9-in hole 44 ft deep through clay and soft shale in 1 min 37 sec. A gear reduction, powered with light-weight hydraulic motors, is mounted on top of the stem. The gear box is so built that the main spindle, when screwed into the drill stem, takes the 15-ton downward thrust. Hydraulic and water hoses travel with the gear box from the top of the 60-ft mast down to the deck of the drive.

Air Flushes Drill Hole

The 48-ft stroke is achieved through wire-rope sheaves, using two sets of six turns around the cylinders for down feed and one set of six turns for up feed. In an average time of 48 min, the machine drills a 9-in hole 45 ft deep through 12 ft of surface, 8 ft of top rock, 10 ft of soft shale, 5 ft of hard blue limestone and 10 ft of slate and hard shale. Good results now are being obtained by using air instead of water to flush the hole.

Commenting on Mr. Utterback's paper, Wendell Reich, of Reich Bros., reported that the recent addition of a Hughes air-jet bit to the third machine has increased the size of cuttings and the speed of drilling. Substitution of air for water has resulted in lower cost, lower horsepower requirements and elimination of water troubles.

Reduction of strip-mine blasting vibrations was discussed in a paper by Robert L. Akre, superintendent of drilling and blasting, Maumee Collieries Corp., Linton, Ind. Mr. Akre's paper is published in full in this issue of

Coal Age.

Drilling and blasting in two-seam strip mining can be done successfully on a 5,000-ton-per-day scale with know-how and the right equipment, according to a paper by Russell Badgett Jr., secretary-treasurer, Badgett Mine Stripping Corp., Madisonville, Ky. Scanning briefly his company's earlier outcrop stripping of the No. 11 and No. 12 seams, Mr. Badgett turned to the present two-seam operation, which uses two draglines working in tandem, and sometimes a third, in a pit 200 ft long or more.

The lead dragline works from a level surface to a depth of 10 or 12 ft, making a roadway as it moves along. The second dragline cuts from the bench to the surface of the No. 12 coal. After the No. 12 coal is removed, the underlying limestone is drilled and shot, the second dragline returning on a berm on the spoil side and casting the limestone.

stone on the bank.

Roads are made on the fireclay below the No. 11 seam after the coal is removed. The No. 12 coal is loaded when there is a minimum of No. 11 uncovered, thus protecting the No. 11 coal from damage by haulage trucks. In fact, the 6 in to 1 ft of fireclay overlying the No. 11 seam is not cleaned off until loading starts, the fireclay acting as a protective cover.

The limestone between the two seams is drilled with a shop-built machine made of a Caterpillar tractor and two wagon-drill heads operating on compressed air and capable of drilling up to 1,500 ft of holes per day. Delay caps are used to subdue blasting vi brations and facilitate breakage. In the past 2 yr, the company has recovered, crushed and sold 550,000 tons of limestone rock, Mr. Badgett added.

More recently, mining has been done in deeper overburden up to 70 ft. Here, a Bucyrus 120-B shovel digs down to a depth of 28 ft, or to the blue shale, through laminated sandstone which has been shot. A vertical auger then moves in and drills the blue shale, A 450-B Bucyrus-Monighan dragline removes the blue shale, working from a berm on the spoil side. In deeper cover, a 6-in to 2-ft band of very hard limestone sometimes appears immediately above the No. 12 seam. This must be shot and removed either by dragline or by dozer.

Home-made improvements at the Badgett operation include the following, Mr. Badgett reported: (1) replacement of the original drive in a Bucyrus-Monighan with four GMC 6-71 engines, thus providing ade-quate power with three engines with the fourth being held in reserve in case of overhaul or breakdown of one of the others; (2) extension of the boom and stick length of the 120-B Bucyrus-Erie shovel, giving greater range; and (3) installation of a second compressor on the Ingersoll-Rand Quarrymaster drill, one being connected to the hammer and the other being used to blow out the hole, thus making it possible to drill up to 420 ft per 8-hr shift.

Haulage Efficiency Boosted

Hydraulic torque converters are becoming the accepted means of handling high-horsepower engines, espediesels, according to D. M. Schaefer, Allison Division, General Motors Corp., Indianapolis, Ind. Mr. Schaefer's paper was presented by H. C. Kirtland, commercial product engineer of the same company, at the Wednesday afternoon session on stripping, T. G. Gerow, president, West Virginia Coal & Coke Corp., Cincinnati, presiding.

Listing the advantages of hydraulic torque converters, Mr. Schaefer named the following: fluid drive, absorption of shock loads and torsional vibrations, avoidance of stalling, high output torque at low output rpm, no "lugging-down" of engine, and increase in the speed range of engine through the effective range of the converter. The type of converter most often used in coal haulage has stators mounted on overrunning clutches and is called a hydraulic torque converter and hydraulic coupling combination.

Horsepower available at the output shaft at various speeds is not only a function of the converter efficiency but depends also upon proper matching of the converter to the engine, so that it operates in the upper 25% of its speed range. The torque converter nermits the engine to operate at all times under optimum conditions, Mr. Schaefer said. Whereas the conventional gear transmission increases or decreases the mechanical advantage of the engine to meet the varying demands of the vehicle load, the converter automatically adjusts to changing loads growing out of grade variation, make-up and condition of road, and other variable factors.

Showing sample performance data for gear-transmission and torque converter haulage units, Mr. Schaefer reported that converter units are known to have hauled 20% more payload than mechanical units of the same horsepower and capacity and that, even though more fuel was used, over-all cost per yard for converter units was 7.5% lower. He warned, however, that where the load variation ranges from 0 to about 19%, mechanical trans-mission probably will be more economical; from 28 to 50%, the converter will save money.

Big augers for highwall mining provide almost continuous strip production, said D. M. Bondurant, assistant professor of mining engineering, West Virginia University, Morgantown, W. Va. Mr. Bondurant presented a paper prepared jointly with C. E. Compton, president, The Grafton Coal Co.,

Clarksburg, W. Va.

The large auger has become generally known in the past 2 yr and now is mining coal that heretofore would have been left in the ground, Mr. Bondurant said. The machine is a direct result of high stripping costs and the need for mining more coal without buying heavier stripping machinery.

The latest big-auger machine to be built is No. 4-a 52-in-diameter auger with 280 ft of auger extension now working near Clarksburg, W. Va., on properties of Clinchfield Coal Co., where the Pittsburgh seam ranges from 5 to 9 ft in thickness. The three main parts of the machine are the frame, the augering unit and the ele-

vating conveyor.

The frame, of welded 18-in steel tubing, provides weight against thrust, assures auger alignment and forms a runway for the augering unit to travel on. Hydraulic jacks with a total lift of 66 in help align the auger with the coal seam. Disk-shaped pontoons at the bottom of each jack provide ample bearing surface. Auger sections are stored on hangers attached to the upper part of the frame. The frame is 56% ft long, 20% ft wide and 14 ft high.

The augering unit consists of the traversing carriage, which is a rubbertired power unit providing thrust for the cutting head as well as rotating power to cut the coal, break it and

convey it from the hole; a string of 35-ft auger sections; and the drilling head, which is a hollow cylinder 6 ft long and 52 in in diameter, with carbide-tipped bits on the rim and a center cutter in the middle. The rear end of each auger section carries a three-arm bearing shoe which suspends the auger free of the wall of the hole. Power is provided by a 300hp Cummins diesel engine.

The actual drilling operation starts with positioning the head and the first auger section. If top and bottom holes are to be drilled, the top hole always is drilled first. The auger advances into the hole at an average rate of 4 fpm. The traversing carriage pulls back at the rate of 136 fpm to permit another auger section to be dropped

in and coupled on.

At the present time, six auger sections are being used to drill holes 210 ft into the coal. Maximum theoretical recovery is 78.5% if the holes are drilled tangent to each other and to the floor and roof of the seam. Since the percentage drops off rapidly as hole distance increases, maximum auger size, up to a limit of about 60 in, is advisable. The present operation mines about 124 tons of coal from each 210-ft hole.

Auger Mining Gains Speed

Pointing out general practices and principles for efficient auger mining. Mr. Bondurant said that the condition of the highwall left by the average stripping operator usually is safe and suitable for auger mining if the work is started at once. Delay may produce sloughing of the highwall and thus make augering more difficult. For best success, augering should be included in the original stripping plan, with such matters as width of pit and drainage being given full consideration. Also, there is an economic factor involved in deciding when to stop stripping and start augering. This will vary from one operation to another. he said.

A question from the floor by S. F. Sherwood, Central Indiana Coal Co., brought out that the undulations in a seam may determine the diameter of the auger to be used. Another question by D. D. Saxton, Hanna Coal Co., revealed that the problem of when to stop stripping and start augering will depend partly on the equipment

at hand.

Spoil-bank materials may soon be used as a sintering material for lightweight aggregates, said T. C. Cheasley, assistant to the president, Sinclair Coal Co., Kansas City, Mo., and chairman, AMC Land Use Advisory Committee. Definite progress in this project may be announced at a later date, he said. He also cited the participation of bauxite, phosphate and iron-ore interests in the AMC Coal Division's land-reclamation projects.

Continuing the report of landreclamation projects, L. E. Sawyer, Indianapolis, Ind., summarized data

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gained by harvesting timber products grown on strip-mine banks and pointed out ways to improve planting, harvesting and processing for satisfactory profits. The conventional 4x4-ft planting is inadequate and some pruning of trees may speed growth and produce a better product, he said.

Spoil banks can pay dividends, said R. L. Ireland, chairman of the executive committee, Pittsburgh Consolidation Coal Co., Cleveland, who commented from the floor on the achievements of land - reclamation groups. He also urged that strippers turn their attention to prevention of stream pollution and that they cooperate on an industry-wide scale in studies now being made by the Interstate Compact Commission, which represents the interests of several states in cleaning up the Ohio River. back of the drive to develop equipment and processes to clean bituminous coal at specific gravities as low 1.35, Prof. Mitchell said in outlining the development of modern equipment.

On the subject of heavy-media, Prof. Mitchell said that processes using magnetite to form a heavyliquid medium have had phenomenal growth in the last 5 yr. Principal characteristics of heavy-media processes using mingnetite as the medium are (1) ability to clean difficult coals efficiently at very low gravities and, in the case of some anthracites, at very high gravities, (2) ability to make precise separations where a high percentage of near-gravity material is present and (3) certain types of vessels require little room, are easily installed in existing plants and lend themselves to relatively low-cost plant modernization programs.

In outlining growth in numbers of heavy-media plants applied to coal and the refinements made in the processes, Professor Mitchell cautioned designers and operators to pay special attention to the auxiliary equipment because in some instances inefficient auxiliaries have limited the overall success of

heavy-media plants.

Coal Preparation

Technical problems and practice in anthracite and bituminous preparation were major topics of one of the Tuesday morning sessions. Speakers were: Byron Bird, technical consultant, Jeffrey Mfg. Co., Columbus, Ohio; W. C. McCulloch, Preparation Manager, Roberts & Schaefer Co., Chicago, Ill.; D. R. Mitchell, head, Department of Mineral Engineering, Pennsylvania State College, State College, Pa.; James Hannigan, superintendent of preparation, Glen Alden Coal Co., Wilkes-Barre, Pa.; F. P. Calhoun, assistant production manager, Rochester & Pittsburgh Coal Co., Indiana, Pa.; and E. R. McMillan, assistant manager of coal operations, Northwestern Improvement Co., Seattle, Wash. C. A. Gibbons, vice president, Susquehanna Collieries Division, M. A. Hanna Co., Nanticoke, Pa., and David Ingle Jr., Ingle Coal Corp., were co-chairmen.

In presenting his answers to some of the preparation questions most frequently asked of him, Mr. Bird pointed out two common shortcomings in wet-cleaning, as follows:

1. Failure to get the raw coal adequately wet.

2. Failure to provide enough capacity for cleaning the extremely fine

With regard to the first shortcom ing, Mr. Bird said that if the coal is extremely dry, a retention period of at least 2 hr is required before the sed is wet enough for efficient cleaning. Evidence of insufficiently wetted feed shows up in a scum on the surface of the washing vessel, Mr. Bird declared, in advising plant operators to make visual inspections of their own vessels.

On the matter of fine-coal cleaning capacity in a wet washery, Mr. Bird said that a plant does not wash "tons per hour" but "particles per hour." Therefore, plant designs must be concentrated on the smallest size to be cleaned because most of the cleaningprocess energy is expended on these fine fractions.

"Pneumatic cleaning of coal has come a long way in recent years," Mr. McCulloch declared, in pointing out advantages of air-cleaned coal, such as winter dryness for easier handling, elimination of stream-polluting fines. and rigid control of the moisture content in the finished product.

"It is admitted that wet fine coal cannot be cleaned with air and federal regulations cause more and more coal to be wetted at the face. However, it has been found to be more economical to pre-dry the coal for air cleaning than to dry the washed coal after it has been recovered from the water," Mr. McCulloch said.

In determining the amenability of coal to air cleaning, factors other than specific gravity are important, Mr. McCulloch pointed out. Particle shape is of great influence with flats, particularly in the heavy bone fractions, invariably reporting with the coal, while cubical pieces of coal in a mixture of irregular particles will tend to show up in the refuse.

Essentially, air cleaning performs a so-called black and white separation over a relatively narrow size range, Mr. McCulloch said, and for optimum results it is desirable to clean an unsized feed and screen the clean coal, with recleaning of the undersize. This process may be repeated in progressively smaller sizes.

Mr. McCulloch described the principles of operation of the Air-Flow cleaner as follows:

The coal and refuse particles enter at the upper or feed end of a reciprocating porous deck and are stratified by pulsating air, which is supplied from an air box or plenum chamber beneath the deck. After the layer of refuse is formed it travels forward into pockets or wells where it is withdrawn. The upper layer of coal travels over the layer of refuse and is withdrawn at the opposite end. Dust created by the pulsating air is sucked into an overhead hood and recovered in a filter or cyclone dust collector.

Mr. McCulloch reported data from a plant cleaning 1%x0 coal from the Eagle seam in southern West Virginia as follows:

Raw coal 10.84% Ash Clean coal without dust . 5.76% Ash Clean coal with dust ... 6.21% Ash Refuse 65.19% Ash Amount of refuse 7.90% Recovery of clean coal . 92.10%

Cost of operation was 4.8c per ton, divided about equally among power, labor and maintenance. Capital costs and amortization are not included.

The trend to full-seam mining, which necessitated mining coals of higher impurity, has been the force

Cleaning Anthracite Fines

Since anthracite has always been produced in closely graded sizes, and operators are frequently called upon to meet different ash specifications in the various sizes, modern equipment for cleaning the fine sizes of anthracite is designed with this in mind, Mr. Hannigan said, in defining the range of anthracite preparation practice as the recovery and marketing of all sizes down to Buckwheat No. 5, 3/64 x 100-m. Froth-flotation plants now are cleaning 28 x 200-mesh fines at a limited number of plants, Mr. Hannigan continued.

Without attempting to point out the merits or shortcomings of units now in service, Mr. Hannigan listed various types of equipment that have received favorable acceptance by the anthracite industry, as follows: Jigs for broken to pea (each size in a separate unit), Chance cones for broken to Buckwheat No. 3, Menzies cones for broken to No. 5 (separate units), dense-media for broken to No. 1. Rheolaveur launders for egg to No. 5, Wilmot Hydrotators for egg to No. 5 (separate units), concentrating tables for No. 1 to No. 5 (separate units), Wilmot Hydrotator-Classifiers and Humphrey Spirals for No. 5, and froth-flotation units for 28 x 200-mesh fines.

Speaking of problems related to mechanical-cleaning processes, Mr. Calhoun stressed the importance of reducing air and stream pollution.

On the matter of stream pollution, Mr. Calhoun said that marketable fines can be recovered from waste water by settling tanks, screens, thickeners, filters and so on, and this recovery equipment should be included in every plant, the choice of equipment depending on local problems

and coal characteristics.

With regard to air pollution, Mr. Calhoun reported that tests on wet gas-scrubbers show that it is possible to remove from 96 to 98% of the solids from the drying gas. However, recovery of the solids from the scrubber is another problem. Some success has been achieved by using a bed of coal or other material to filter the exhaust gases, Mr. Calhoun continued. If the filter bed is constantly changed, the dust can be recovered with the coal or wasted with the refuse, depending on which material is used as

a filtering medium in the process. Another source of air pollution near

cleaning plants is the smoke and gas from gob fires, Mr. Calhoun declared. These fires can be prevented by proper piling and compaction of the waste material, crushing of refuse to provide enough fines to make a compact bed, and sealing the edges of gob piles with clay to prevent admission of oxygen, Mr. Calhoun concluded.

Use of his company's shop-made Vissac-type drier for removing the moisture from wet-washed minus 14in coal was outlined by Mr. McMillan. Plant output, up to 3,600 tpd, is cleaned in Baum-type jigs, with the small-

er sizes sent to the drier.

Promoting Mine Safety

Protection against electrical hazards, pulmonary diseases in coal mining, advances in mine lighting and the adaptability of diesel locomotives to coal mining were topics of G. C. Barnes, professor of electrical engineering, Virginia Polytechnic Institute, Blacksburg, Va.; Dr. A. J. Vorwald, director, Trudeau Foundation, Saranac Lake, N. Y.; G. F. Prideaux and C. M. Crysler, illumination engineers, General Electric Co., Nela Park, Cleveland, O.; and J. H. East Jr., regional director, U. S. Bureau of Mines, Denver, Colo., respectively, at the Wednesday morning safety session. I. N. Bayless, president, Union Pa-cific Coal Co., Omaha, Neb., was chairman and Arthur Bradbury, safe-ty engineer, Inland Steel Co., Wheelwright, Ky., co-chairman.

Noting that the replacement of manpower by electrical energy in the performance of many underground tasks is reflected in the increased number of electrified units in coal mines, and a corresponding increase in electrical hazards, Professor Barnes presented his recommendations for increasing safety, as follows:

1. Properly protected primary or high-voltage circuits should be used. 2. Mines employing grounded oper-

ating circuits and machine-frame grounds should consider the use of devices on all units for tripping protective circuit-breakers when ground current appears.

3. In trackless mines, isolation of all AC and DC operating circuits should be given serious consideration. 4. The use of AC equipment underground should be expanded.

5. Where possible, tracked electrical haulage should be minimized.

In discussing Professor Barnes' findings, John Whittaker, safety inspector, Pittsburgh Coal Co., Library, Pa., added that protective clothing appears to be a secondary approach to increased electrical safety; physical condition of the men is important in resisting the effects of electrical shock; machines should be equipped with circuit breakers as well as fuses; and men and officials should receive

better training for electrical safety discipline.

The problem of pulmonary diseases resulting from inhalation of mine dusts requires two-way investigation, Dr. Vorwald declared. The study of mine atmospheres is extremely important and, on the other hand, the physiological effect of mine dusts on human lungs must be studied if defiprevention is to be nite disease achieved. On the basis of studies in bituminous coal mines, Dr. Vorwald emphasized the importance of taking dust samples at the breathing level of the workers. Free-silica content of native rock, as determined chemically, may not be a true indication of the free silica the workers breathe.

Using slides to demonstrate the condition of healthy lungs in contrast to lungs ravaged by respiratory diseases, Dr. Vorwald recommended continuing intensive research as the best approach to eventual solution of the

problem.

Miners' cap lamps have been re-markably improved in illuminating power since the early models, Mr. Crysler declared, in noting the progress of mine-lighting to date and ad-

vances yet to be made.

Fundamental factors in seeing are size of the object, time available for seeing, brightness of the object and brightness contrast of the task, Mr. Crysler continued. In expanding the fundamentals, Messrs. Prideaux and Crysler advocated that efforts to improve mine lighting begin at the face, and made specific recommendations, as follows:

1. Lights on face machinery require considerable further study, but until the time new and better units are available, management must promote good maintenance of present lighting equipment. Fixtures should be tight, lenses and reflectors clean, and bulbs with rugged filaments used.

2. Dust obscures objects illuminated by a cap lamp or other source of light. Dust-allaying, therefore, is a prime factor in promoting better visibility.
3. White surfaces increase bright-

ness contrast. Comparative studies between rock-dusted working places and non-dusted places point out the superiority of the rock-dusted places in making the most of available light.

4. Fluorescent fixtures might applied in haulage entries and other fresh-air openings, with fixtures protected from water and dust by plastic sprayed films, such as Cocoon.

5. Assign an experienced mining man the sole job of improving seeing, and equip him with necessary tools, such as a visibility meter, a brightness meter and a light meter.

Using Diesels in Coal Mines

"Diesels have been used successfully in Europe for 30 yr, coal-mine atmosphere and ventilating problems in Europe are the equivalent of those in the United States and those mines basically are the same as ours from a health standpoint. Thus, the use of diesel locomotives is not an experiment, nor is it anything new, except in the United States," Mr. East pointed out in a survey of the factors to be considered upon the adoption of diesel power underground.

Additional ventilation will be required in mines using diesel units occause about 75 cfm of air per brake horsepower developed by the engine will be needed to dilute the exhaust gases. This is in excess of the air passing through the mine in compliance with existing regulations.

The oxygen content of the air must be maintained at 20% or more for satisfactory diesel operation, Mr. East added, and mine elevation will be an important consideration. In this regard, Mr. East explained that an engine adjusted to a 20 to 1 air-fuel ratio at sea level will be less efficient at a higher attitude because, while the air is rarer, cylinder-volume remains constant.

Exhaust-gas scrubbers are a necessity to remove the objectionable odorproducing aldehydes. Mr. East reported that the Bureau of Mines has partially developed a sodium hyposulfite-hydroquinone process for removing substantially all aldehydes for extended periods. The process can be employed economically in simple

scrubbing equipment. Diesel locomotives can be used in coal mines with reasonable safety, Mr. East said, if they are restricted to main and intermediate haulageways where there is adequate ventilation, if they are properly maintained and inspected, if safety precautions for the handling and storage of fuels are observed, and if they have flame arresters on both intake and exhaust

openings.

Richard Maize, secretary of mines, Pennsylvania Department of Mines, Harrisburg, Pa., in a discussion of diesel power, invited trials of diesel units in Pennsylvania mines, provided they are restricted to main haulageways and that written permission of the mine inspector be obtained.

American Mining Congress Equipment Show Report



Cardox underground coal-recovery drill.

Equipment Show Tops Record

Mechanical Loading

(1) Cardox Corp., Chicago—New Cardox-Hardsocg underground coalrecovery drill, said by the maker to be a low sturdily constructed unit capable of driving augers 16 to 30 in in diameter in multiple sections 6 ft long. Major design features include location of the frame to one side of the auger to reduce height, and ability to drill both ways from the same location. Auger speed is 45 rpm; weight, 8,000 lb; overall length, 10½ ft; width, 6 ft 4 in; height, 24 in. A 25-hp 230-v permissible type motor provides power and the drive includes a fluid ecoupling.

(2) Clarkson Mfg. Co., Nashville, Ill.—Clarkson 28FA Redbird loader mounted on dual rubber tires for high mobility and with differential eliminated for increased traction.

(3) Goodman Mfg. Co., Chicago— New combination mining and loading machine, new 860 low-type and 665 standard-height tractor-tread loading machines, new swing-motion device for Types K and E duckbills, and new lightweight "Duckling" for narrow work.

Designed for loading into low-vein shuttle cars, shaker conveyors and chain conveyors, the Type 860 tractor-tread loader has a rated capacity of 5 tpm and features full hydraulic control. Other features include the following: overall height, 26½ in; coal line, 17 in above floor; roadway clearance, 5 in; extra-wide 12 in treads; permissible electrical construction; contactor control; two-speed tramming; sturdy frame construction; vertical range of 12 in below ground level to 19 in above; and 40-deg swing each way for head and rear conveyor.

For use in high coal with large shuttle cars, the Type 665 loader has a rated capacity, according to the manufacturer, of 8 to 10 tpm in free coal. With a 40-deg swing each way,

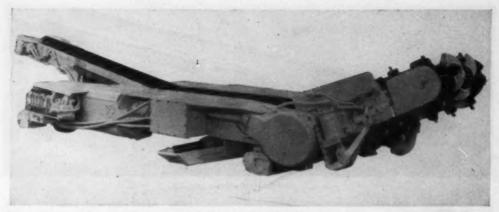
it can clean up a place 18 ft wide.

The new "swing trough" for the Goodman duckbill-shaker conveyor consists of a short trough inserted between duckbill and swivel trough to permit swinging the duckbill either way during the loading cycle. Power for side swing is provided by the regular motion of the trough line, with swing direction controlled through clutches by wire rope from drums on swing trough through sheaves on duckbill operating carrier and thence to the ribs. The swing trough can be installed on either the Type E or K duckbill and can be used with either a 30- or 45-deg swivel trough. A companion Type K14G-16 duckbill exhibited by Goodman features an improved operating mechanism-less grip block adjustment, greater clearance over the floor and operating levers with short strokes either way from neutral.

Designed primarily for light work in anthracite mining, the Goodman



Goodman 860 tractor-tread loader.



Joy 24-in "walking-type" Continuous Miner.

"Duckling" is described as ideal for driving narrow rooms where close timbering is required, and for development work, such as gangways. Short length and light weight permit moving from level to level through small openings. Used with a bellcrank or crosscut drive, it mechanizes crosscutting up to a 90-deg angle. Overall length is 10 ft; total weight, 500 lb; effective extension, 6 ft 3 in. It has loaded up to 35 tph.

(4) Jeffrey Mfg. Co., Columbus— Model A Colmol, 33 to 53 in, for thin seams, and Model B Colmol, 45½ to 72 in and up, for thick seams.

(5) Joy Mfg. Co.—New 20-BU-1 loading machine for 30-in coal (Coal Age, February, 1951), Joy 18-HR-2 rock loader, Joy 3-JCM continuous miner for coal 40 in or more in thickness, new Joy "walking-type" continuous miner for thin coal, and the new AD-2 coal borer for underground work.

The walking miner, supported at the rear on rubber tires and at the front on a shoe, walks or advances in short steps to keep up with face advance. Like the standard-type miners, it includes a new type of mining head,

How to Get the Most Out of This Report

THE EQUIPMENT DESCRIPTIONS on the following pages are based on a booth-to-booth survey of the exhibits at the 1951 Cleveland Coal Show, classified by type of product to save you time in finding the equipment you're interested in.

THIS SHOW REPORT is the most up-to-date roster of equipment and supplies for coal mining now available and offers you an opportunity to make sure you have information on all the worthwhile items in your field. The postage-free card facing p 140 will simplify your request for manufacturers' catalogs and bulletins. As you go through this section, note the numbers on each of the paragraphs that interest you, write in those numbers on the postage-free card and mail it to COAL AGE. We'll pass your request for data on to the manufacturers.

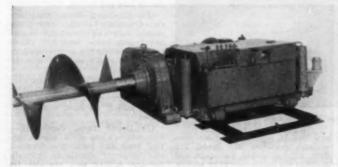
consisting of a "milling-type" cutter driven by cutting chains at either end. The front shoe is equipped with jacks for swinging the miner from side to side. Rated capacity of the unit is 1 tpm. Overall height is 24 in. Vertical mining height is from 5 in below to 48 in above the floor line. Minimum room width is 11 ft; minimum width for 90-deg crosscut, 14 ft. The main motors are two 65-hp continuous units. Tramming speed is 25 fpm.

The new AD-2 coal borer for underground work, according to Joy, accommodates either 24 or 30-in augers 4 ft long, and drills to 100 ft. Maximum feed of the chuck is 5 ft. Auger speed is 75 rpm. Thrust through the chuck is 9,500 lb. Winch pull is 5,000 lb. The unit is powered by a 40-hp continuous motor, 250 or 500 v DC, permissible.

(6) Lee-Norse Co., Charleroi, Pa.— New "Koal-Master" continuous-type rubber-tired cutting and loading machine (see p 94-95 of this issue).

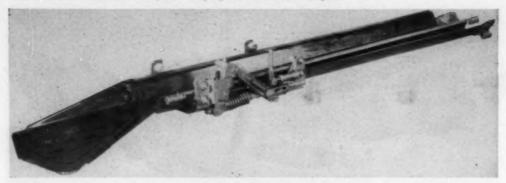
(7) Myers-Whaley Co., Knoxville, Tenn.—No. 3 Whaley Automat trackmounted loading machine.

(8) Salem Tool Co., Salem, Ohio— 36-in coal-recovery auger with electric motor for underground mining, boring airways, etc.

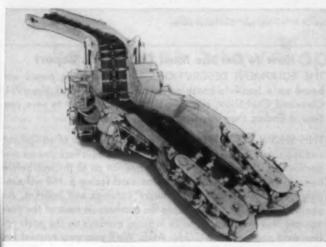


Joy AD-2 coal borer for underground mining.

American Mining Congress Equipment Show Report



Goodman Duckling.



Goodman 665 tractor-tread loader.



Goodman "Swing Trough" for power duckbill.

Face Preparation

(9) Acme Machinery Co., Williamson, W. Va.—New jumbo with long-feed drifter drills (LeRoi-built), and

new line of portable mine air compressors featuring the Model 275 SPR, fully air-cooled, two-stage, and designed for continuous 24-hr service. Overall height is 27% in with 6 in of ground clearance. Length is 15 ft; overall width, 72 in; available with either electric or air-motor tram. Actual delivery, the company states, is 275 cfm at 100 lb.

(10) American Cyanamid Co., Explosives Dept., New York—Explosives and blasting supplies for deep-mine shooting.

(11) Armstrong Coalbreak Co., Benton Harbor, Mich. — "Airbreaker" shells, compressors and auxiliaries for air-breaking of coal, including new self-propelled cable-reel compressor unit, 4-wheel drive and steer, mounted on rubber tires for complete mobility; also new shooting valve especially designed for ease and speed of operation and fast air release.

(12) Atlas Powder Co., Wilmington, Dela.—Mining explosives and plasticinsulated lead wires.

(13) Austin Powder Co., Cleveland
—Complete line of drilling tools, including tungsten-carbide cutting and drilling bits.

(14) Bowdil Co., Canton, Ohio-Bowdil cutter bars, chains and bits for all types of machines.

(15) Carboley Co., Inc., Detroit—Carboley mining tools.

(16) Cardex Corp., Chicago—Cardox and Airdox coal-breaking equipment; complete line of Cardox drilling equipment, including augers, molefoot and carbide-tipped cutter heads, bits, thread bars and boxing.

(17) Cincinnati Mine Machinery
Ca., Cincinnati — Cincinnati cutter
chains, bars and sprockets; Stanex
and Duplex cutter bits; new Cinide
tungsten-carbide bits in various styles
for various chains and service conditions.

(18) Crichton Ca, Equipment Div., Johnstown Pa.—New-design Crichton flexible-shaft drill operating from power takeoff on most mining machines.

(19) Deoley Bros., Peoria, Ill.— Post-mounted coal drills, augers, cutting heads and auxiliary equipment; new "Superior" completely hydraulic two-arm drilling unit available for rubber-tired or track mounting. The



Goodman RHT-2 tractor-tread utility truck.



Joy combination drill and timber-setter.

unit features hydraulic feed and steer, variable feed speeds, and adaptability to any size of auger. Tramming speed ranges up to 4 mph.

(20) E. I. du Pont De Nemours & Co., Inc., Wilmington, Dela.—Permissible explosives, iron-wire blasting caps and permissible blasting machines for underground mining; also du Pont "Detect-a-Meter" and new Chemechol coal-breaking system recently announced and now undergoing extensive mine tests.

(21) Firth Sterling Steel & Carbide Corp., McKeesport, Pa.—Firthite mining tools, include "Blue Bits."

(22) Fulton Bag & Cotton Mills, New York 17—Fulton Scotch Seam tamping bags.

(23) Goodman Mfg. Co., Chicago New Goodman Type 69 cutter chain, Type 512EJH shortwall featuring hydraulic control and bugduster, Type 121 bugduster for Type 12 shortwalls, and new Type RHT-2 tractor-tread utility truck with cable reel and power takeoff for transporting shortwalls, shaker drives and troughing, belt and chain-conveyor parts, supplies and repair parts. Featuring drop-front construction, the unit is powered by two 5-hp motors (traction, cable reel and wire-rope drum), and has a tramming speed of 130 fpm. Weight of truck without reels is 6,600 lb; with reels, electric cable and wire-rope, 7,765 lb.

(24) Herb J. Hawthorne, Inc., Hous-

ton, Tex. — Self-sharpening throwaway - type tungsten - carbide - faced cutter bits.

(25) Hercules Powder Co., Wilmington, Dela.—Explosives, delay detonators and 10-cap permissible blasting machines.

(26) Jeffrey Mfg. Co., Columbus— 70-URB rubber-tired universal cutter; 74-BR all hydraulically-operated rubber-mounted drilling machine.

(27) Joy Mfg. Co., Pittsburgh—Sulmet bits, 7-8 heavy-duty shortwall, 11-B shortwall, 12-RB mobile cutter (Coal Age, February, 1981), L-37 lightweight hand-held rock drill, and the new Joy combination drilling and timbering machine. The latter consists of a coal drill equipped with a saddle to permit setting timbers mechanically. Drilling is done hydraulically and a telescoping boom permits drilling the entire face from one setup.

Specifications for the combination unit include the following: maximum timber lift (under timber), 8 ft 8 in; boom swing, 60 deg either side; drill-feed length, 10, 11 or 11% ft; hole size, 2%, 2% or 3 in; pump motor for hydraulic drill, 15 hp; traction motors, each, 5 hp; timber storage on top of machine, 60 in wide and 14 ft long; overall height without timbers, 41 in; width, 7 ft 4 in; tramming speed, 2% mph; two-wheel hydraulic steer; hydraulic timber saw and timber lift.

(28) Kennametal, Inc., Latrobe, Pa.

-Kennametal bits for all cutting and drilling applications, including new recessed-insert mining bit for cutting rock binders, unusually hard coal, etc.

(29) LeRoi Co., Cleveland Div.— New 17-lb H-22 pneumatic drill for wet drilling on light jobs, featuring interlocked air and water valves.

(30) McLaughlin Mfg. Co., Joliet, Ill.—Conveyor augers and drive sockets for carbide and alloy bits, McLaughlin square bits and heads, McLaughlin spiral drill bits and heads, new double-scroll auger for extra rigidity and better hole cleaning, and new regular-style drill bits with shanks to permit interchange with carbide bits to better suit drilling conditions.

(31) Olin Industries, Inc., E. Alton, Ill.—Western Cartridge blasting caps; Equitable, Liberty, Egyptian and U. S. explosives and powder.

(32) Precision Chain Co., Terre Haute, Ind.—Precision cutter chains for both Rockbuster-Multiplex and standard ½x1 bits, plus chain links, bits and other cutting equipment.

(33) Frank Prox Co., Inc., Terre Haute, Ind.—Prox Duomatic cutter chains for conventional and hardmetal bits; throwaway bits, cutter bars and sprockets for various cutters.

(34) Tamping Bag Co., Mt. Vernon, Ill.—Sealtite wet-strength tamping bags in 65 stock sizes.

American Mining Congress Equipment Show Report



New Crichton flexible-shaft drill.



Manco Model 40 "Guillotine" roof-bolt cutter.



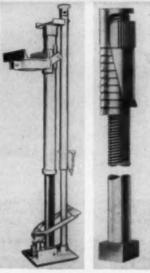
New Goodman Type 69 cutter chain.



Kennametal Type HFD bolting drill.



LaRoi crawler stoper with dust collection.



Star roof-bolt drilling jack and timber-setter. Hubbard "Wedge-Nut" roof bolt (right).

(35) Bertrand P. Tracy Co., Pittsburgh-Tracy cutter bars and chains.

(36) Vascoloy-Ramet Cerp., Waukegan, Ill.—Cemented-carbide mining tools, including straight-shank, shoul-der-type and continuous-miner-type cutter bits; hand-held and mounted auger drills.

Roof Control

(37) Acme Machinery Co., Williamson, W. Va.—New Model 275 air compressor for roof-bolting (see Face Preparation section), described as the largest portable air compressor now being offered as a standard package; also the Model 210 skid-mounted or rubber-tired compressor, 30 in high, 217 cfm at 100 lb, plus a complete line of roof-bolting stopers, drill steel, air hose and rock bits for roof-bolting and other mine work.

(38) Armco Drainage & Metal Products Ca., Middletown, Ohio—Armco tunnel and shaft liner plate.

(39) Baker-Raulang Co., Inc., Cleveland—See J. H. Fletcher Co.

(40) Bethlehem Steel Co., Bethlehem, Pa.—Complete line of wedge- and aleeve-type roof bolts and accessories, including new roof-bolt extensions designed to eliminate the difficulty of using long roof bolts in low coal. In operation, the regular mine roof bolt is inserted first and is followed by the extension, the entire assembly then being driven up in the usual manner.

(41) Carboloy Co., Inc., Detroit 32
—Carboloy roof-bolting drills.

(42) Chicago Pneumatic Tool Co. New York—Air-operated roof stopers and new mobile roof drill and bolting unit mounted on three rubber-tired wheels with an overall height of 28 in and a drill feed of 30 in. One motor drives both auger and nut-runner and is quickly retracted without movement of the unit, it is stated, to permit application of the nut-runner. The unit has a drilling speed of 4 fpm, a return of 8 fpm, and develops a maximum nut-running torque of 300 ft-lb.

(43) Colorado Fuel & Iron Corp., New York 22—New line of wedgetype roof bolts and accessories developed at the company's Colorado coal mines.

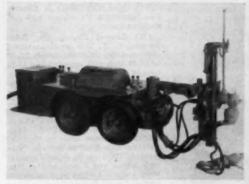
(44) Duff-Norton Mfg. Co., Pittsburgh 30—Full line of mine-timber, roof, pin-timbering and angle jacks and fittings for all types of roof supnort.

(45) Elreco Cerp., Cincinnati—Elreco roof-bolting supplies and methods.

(46) J. H. Fletcher & Ca., Huntington, W. Va.—New Baker roof drill and wrench for expansion-shield bolting. The unit tilts 45 deg either side for vertical or angle bolting. Tramming height is 44 in, with 50 in of height for operation. (Coal Age, January)

(47) R. M. Hollingshead Corp., Camden, N. J.—Cocoon vinyl-plastic film for roof-sealing (Coal Age, March, 1951).

(48) Hubbard & Co., Pittsburgh-



Joy RBD-10 self-propelled roof-bolting drill.



CP mobile roof drill and bolting unit.

Hubbard Wedge-Nut roof bolts.

(49) Jey Mfg. Co., Pittsburgh—RBD-1 self-propelled roof-bolting drill, RBD-7 drilling unit for mine mounting, SAW wagon stoper, SAE-91T telescopic-feed stoper, SAL-37 60-lb stoper, SAE-91 28-in-length stoper, WK-83 mine-air compressor, WN-112 heavy-duty stationary compressors, the new RBD-10 and DM-6 roof-bolting drills, and three new hydraulic impact wrenches.

The RBD-10 drill is described as a compact self-propelled unit carrying a hydraulic roof-bolting drill. The drill is mounted so that holes can be drilled at any angle. Right- and left-hand wheels are individually operated to provide high maneuverability. Overall height is 29 in; width, 36 in; length, 106 in; motor, 10 hp; length of drilling-unit feed frame, 2½ to 7½ ft in 6-in increments; tramming speed, 145 fum.

The DM-6 companion drill is pneumatically operated and self-propelled for use where the roof is too hard for auger-type drills. The stoper can drill at any angle, and either a chain-feed or telescoping feed may be supplied. Height is 33 in; width, 36 in; length, 72 in; weight, 1,500 lb; ground clearance, 6 in.

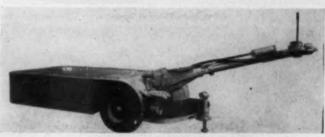
The hydraulic impact wrenches, in three styles, are, respectively, feedleg mounted, chuck-mounted and hand-held, with hydraulic power from whatever RBD-type drill they are being used with.

(50) Kennemetal, Inc., Latrobe, Pa.

-New tungsten-carbide roof-drilling bit for laminated sandstone, some limestone, shale, slate, etc. It is a rotary bit, Type HFD.

(51) Koppers Co., Inc., Pittsburgh 19—Pressure-treated wood, including timber sets and roof lagging.

(52) Lee-Norse Co., Charleroi, Pa.— New Model RJ4 "Roof-Service Jeep" designed for one-man operation and consisting of a rubber-tired carriage with hydraulic drill. The latter features, the company points out, high apeed for roof drilling and low speed for setting bolts. The drilling boom is readily converted to timber-setting.



Les-Nerse RJ4 "Roof-Service Jeep."

Hydraulic saw is optional. The top of the unit provides space for carrying timbers.

(53) LeRoi Co., Cleveland Div., Cleveland—New permissible crawlertype stoper featuring dry dust collectors with replaceable filter elements.

(54) Manco Mfg. Co., Bradley, Ill.

—New Model 40 "Guillotine" roof-bolt cutter described as fast and easy to use in trimming bolts flush. Cutting-time to only '2½ sec; capacity, 1-in bolts; cutting-head weight, 28 lb; power, portable hydraulic pump.

(55) Mine Safety Appliances Co., Pittsburgh 8 — M-S-A bolt-hole cleaner.

(56) Ohio Brass Co., Mansfield, Ohio-O-B mine roof bolts.

(57) Oliver Iron & Steel Corp., Pittsburgh 3—Oliver roof bolts.

(58) Osmose Wood Preserving Co. of America, Inc., Buffalo 12, N. Y.— Osmose timber treatment; Osmose wooden mine-roof pins.

(59) Patton Mfg. Co., Marietta, Ohio-Roof bolts, including special types for low coal.

(60) Pittsburgh Screw & Bolt Co., Pittsburgh 30—"Pit-Bolts" in both the expansion and split-rod types; also plate assemblies.

(61) Star Jack Co., River Grove, Ill.—Star aluminum roof and timber jacks; new dual-foot hydraulic timbersetter and roof-bolt drilling jack. (62) Templeton, Kenly & Co., Inc., Chicago 44—Specialized roof and timber jacks, in eluding ratchet- and acrew-operated types for all seams heights.

(63) U. S. Bureau of Mines, Washington 25—Roof-control studies and equipment, including new "Stratascope" for picturing roof action through bore holes.

(64) Vascoloy-Ramet Corp., Waukegan, Ill.—Roof drills.

(65) West Virginia Steel & Mfg. Co., Huntington, W. Va.—Full line of wedge and expansion-type roof bolta with washers, plates and roof ties.

Mine Cars, Shuttle Cars, Locomotives and Track

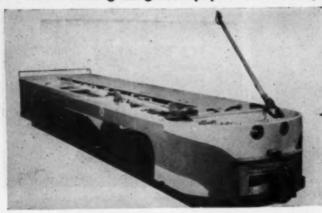
(66) American Car & Foundry Co., New York.—ACF 135-cu ft drop-hottom mine car, one of first 100 built for a West Virginia mine. Track gage is 44 in; wheelbase, 50 in; length, 14 ft; height, 28 in.

(67) American Mine Door Co., Canton 6, Ohio—Canton track cleaner; Canton automatic switchthrowers.

(68) American Steel Foundries, Chicago 11—New automatic self-levelling self-centering mine-cay coupler in swivel or rigid types.

(69) Bethlehem Steel Co., Bethlehem, Pa.—Latest-type 17-ton mine car with cast-steel trucks, forged-steel

American Mining Congress Equipment Show Report



Jeffrey 25-ton 8-wheeled locometive.



Jeffrey 42-in cable-reel shuttle car.



Goodman Type 580 elevating-discharge skuttle car.

wheels, cushion draft gear and automatic couplers; heavy-duty rail, switches and trackwork; new detachable guard rail, said to be easily installed by tapping rotating clips into place.

(70) Brown-Fayre Co., Johnstown, Pa. — Brownie car- and trip-spotting holyta.

(71) Cheatham Electric Switching Device Co., Louisville, Ky.—Electrically operated track switches and derails operated from locomotive without reducing speed, including new non-directional contactor for mounting under feeder, and new condenser units for faster switch operation.

(72) Coal Mine Equipment Sales

Co., Terre Haute, Ind.—Rebuilt mine locomotives.

(73) Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.—Rotary dumpers, sheaves, skips, cages, hoists, haulage and related equipment.

(393) Differential Steel Car Co., Findlay, Ohio — Mine-car rotary pumps.

(74) Enterprise Wheel & Car Cerp., Bristol, Va., Tenn. — Two late-type steel mine cars, one an 8-wheeled 10-ton all-welded unit equipped with Willison couplers and National Malleable trucks, and the second a 91-cs ft drop-bottom car equipped with the latest-type safety latch, spring bumpers and Timken trucks.

(75) Flood City Brass & Electric Co., Johnstown, Pa.—Room and carspotting hoists.

(76) General Electric Co., Schenectady, N. Y., New crawler-mounted cable-reel shuttle car in models 36, 42 or 54 in high with capacities up to 14 tons in the high model. Easy steering, low ground pressure and high maneuverability are stressed by the builder.

(77) Goodman Mfg. Co., Chicago-New Types 580 and 581 right- and left-hand elevating-discharge shuttle cars. Cable-reel operated, the basic height of the cars is 42 in. Capacity water-level is 157.6 cu ft; with 12-in topping, 200.2 cu ft. Speeds are 31/2 mph loaded and 4 mph empty. Features include 4-wheel easy-to-operate automotive-truck-type hydraulic brakes with brake-locking lever; 4-wheel mechanical steer with hydraulic booster; hydraulic elevating dis-charges which may be fitted with 27to 57-in extensions; two 10-hp traction motors centrally located on each side of the ear; 40-in conveyor driven by 74-hp motor which also drives hydraulic pumps; permissible-type electrie enclosures (without approval plate); magnetic control providing automatic acceleration; manually operated reverser; dual headlights and dual operating levers.

(78) Robert Holmes & Bros., Inc., Danville, Ill.—Hoists, skips, car retarders, sheaves, etc.

(79) Hunslet Engine Co., Leeds 10, England — Diesel mine locomotives, with 100-bhp 15-ton 15-mph unit on the floor. Tractive effort in low gear is 8,000 lb. Low-height models are available for U. S. use.

(80) Irwin Foundry & Mine Car Ca, Irwin, Pa.—Irwin steel mine cars.

(81) Jeffrey Mfg. Co., Columbus— New 25-ton 8-wheeled main-line locomotive with all-welded frame and capable of operating over 50-ftradius curves. Features include four 80-hp ventilated motors for 8 mph (120 hp for 12 mph), full electropneumatic contractor control with dynamic braking, straight air brakes, air sanders, auxiliary air tank for emergency dynamic braking, and storage-battery operated controls and headlights.

Jeffrey also exhibited a new 42-in shuttle car, also available in 30- and 36-in heights. Features include 4-wheel drive, steer and braking; two 10-hp traction motors and one 10-hp hydraulic-pump motor, all three interchangeable; hydraulically driven cable reels (6-hp hydraulically driven conveyor chain.

(82) Jey Mfg. Co., Pittsburgh—S-SC and 10-SC cable-reel shuttle cars and the new Joy diesel-electric shuttle car described as a high-speed high-powered car capable of operating on grades in excess of those possible

Turn to P 128 for 15 More Pages of Equipment Show News

COSTS GO DOWN, HAULAGE SPEEDS GO UP WITH

Exide-Ironclad

BATTERY POWER

LOW COST MOTIVE POWER! It's one of the places where mine costs can be cut. Exide-Ironclad Batteries in your locomotives, trammers and shuttle cars can help. They're inexpensive to keep charged, absorb a very high percentage of current, return it in useful work. Here are other operating advantages and cost saving benefits of Exide-Ironclad Batteries:

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Think! It's Part of Every Job

Point Your Thoughts to the Heart of the Problem—When You Can Do That You'll Reap the Benefits of Creative Thinking







TO MANUFACTURE AN IDEA, Get All the Facts . . . Reject the Irrelevant, Refine the Relevant . . . And Apply the Result of Your Thinking.

THINKING, if properly practiced, can be a most beneficial and profitable exercise. It can give the satisfaction of settling problems. It can produce ideas that pay off in business success. It can bring personal happiness.

When does a fellow find time for this mental sport? The answer is: mostly during periods that might otherwise be idle and unproductive the lull after a task is finished; the start of the day; the hours of relaxation. It can be a diversion and a healthy hobby.

Do we have time for this kind of thinking on the job? A time schedule of work assignments is much like the budgeting of expenses against our income. There are so many interrupting and interfering factors that the plan fails to be practical.

A working time schedule should be flexible. One that can be disregarded and deferred when the "must" jobs are active and urgent; one that can act as a reminder for the "ought-todo" tasks and those apt to be overlooked or forgotten in the time intervals when "must" tasks are finished.

Such a plan can promote efficiency. It can gather up the loose ends. It can blanket the entire time area of the job completely. Perhaps its most effective service is in the use of time that might otherwise be wasted, to spur the imagination into creative thoughts and thus achieve unexpected results.

One reads a lot about CREATIVE thinking. What does it mean? How does one go about it?

Creative thinking, they tell us, is the driving of imagination to work. First pick a target to aim our thoughts at and then give them a full range. Later the ideas generated by this brain activity can be collected and controlled by practical guidance. Simple, ian't it?

Imagination, however, is temperamental. It is most effective when given free rein, but this does not mean letting it take its own course. It should be directed into productive channels and it has to be frequently nudged into the highway when it detours too far afield.

One form of imagination leads into harmful territory—peraecution complexes, inferiority, delusions and delirium. So often it is subject to misuse, as in the case of worry.

Creative thinking, on the other hand, is forward thinking with specific objectives. One of its functions is to hunt. The other to make things over. Its chief aim is something new and different. It should be driven into productive lanes. With the exception of dreams, it is largely controllable.

Funny thing about creative thoughts. They flow but under peculiar circumstances. Thinking wants no interference. Like Greta, it needs to be alone. Some folks do their best when fishing, or when listening to music. Some just stare out the window. The bed, the bedside pad and pencil are great aids to ideas and schemes. Even insomnia can make imagination more than normally active.

If one has special talent, so much the better. But no talent is brilliant enough to create without conscious effort. Talent dims down and dries up when effort lags and dies. You lose what you are endowed with if you do not make use of it. Moreover, hidden talents you don't realize you have may be given birth by energetic thinking. It's a good cure for laziness and for lack of confidence, too.

Age is no excuse for not being creative. If we let ourselves get in a rut, lose our zest for life, quit being curious, just plain stop trying—then we cannot help but be less creative and, incidentally, less happy and youthfully alert.

We hear of the persistent ambitions that rise above discouragement to bring money and fame. We seldom hear of the hopes that are buried un-

There is so much good in the worst

And so much bad in the best of us, That it hardly behooves any of us, To talk about the rest of us.

-Unknown

der the crust of lethar v. We need a primer to our brain pump to overcome the natural inertia of unassigned hours. Don't wait for things to turn out well. Once we get started we can be fire engines, but it is so easy to lag when some demanding duty is not facing us. It may be easier to tackle routine first, but it's better to do our thinking first. The cash rewards of creative effort are good but an even greater reward is in the coin of happier living. Succeas stories are built on such a foundation.

Don't be afraid to team up with others to seek opinions and work out ideas. Relations and comparisons are helpful, too. Imitation, with some slight twist, modification or rearrangement, can give birth to benefits. Search for alternatives. Form an idea clinic among co-workers. It is a good breeding ground for suggestions and suggestions create ideas.

Ideas need analysis before being applied. Ply them with questions. Bring out the practical phases of putting them to work.

Speaking of work, it has been quoted: "There are some people who work, others pretend to work, and a few do neither." Unless one is in the first group, he will not have the initia-

The Logical Road to Security

The key to production is people.
 The most important single individ in this striking for selected are

ual in this striving for enlarged production is the foreman.

 There should be increased communication between the foreman and his senior supervisor.

4. It is through the leadership of the supervisors that the belief can be transmitted that increased security results from increased productivity.

-Richard S. Reynolds, Jr., President, Reynolds Metals

tive or energy to get the most out of imagination.

Few good ideas are stumbled upon. They are the result of working the brain. Ideas in quantity are needed, as the percentage of practical application is low. Set a quota of subjects for thought. Keep it going. Continuity, faithfulness and persistence are so necessary. Don't wait for inspiration. From planting to harvest, creative ideas require infinite patience and heroic courage. If born in confidence and with hopes that rise above crit-

icism and discouragement, creative thoughts can achieve greatness. While we owe most, if not all, the comforts of life to the inspiration of others, yet it is a paradox that the world called them fools before accepting the benefits they produced.

What are some of the obstructions in creative thinking? And what can

boost its morale?

Perfection and judgment are mighty fine traits and both are essential in the successes of life. But either may choke off good ideas. The fellow who never makes mistakes may find it difficult to proceed with a sketchy idea. As for judgment, it should be delayed, at least until ideas can be tried out.

Doubts may blight their growth. Aids to the production of creative ideas are many. Praise is a fine thing at all levels of business. Association plays a part, as a chain of ideas may spring up from memories, a name, a book, a tune. A note book can be a valuable asset, storing up idea starters that might otherwise be forgotten. An accumulated knowledge may be the gasoline which runs the engine of thought. First-hand experience provides the richest fuel for creative power.—Reprinted from Electrical Mining, Goodman Mfg. Co.

Rights and Responsibilities

THE TRAFFIC LIGHT WAS RED. In the fourth car back, a group of young men were seemingly in a terrific hurry. The driver was blowing the horn while one youth stuck his head and one arm out of the car window and yelled for the others to get moving. In his hand was a beer can. The other youths were apparently enjoying themselves immensely.

The bystanders and other motorists thought the incident disgusting to say the least, but they did nothing more than ignore it. They did not step into a store or other convenient place to call the police and request that the young men be stopped before they injured themselves or others. Less than an hour later, two of these boys were dead and the others were in the hospital. Fortunately they injured no one other than themselves.

The big trailer truck pulled up the hill at 5 mph. Ten to twenty cars built up traffic behind it. None dared to pass. At the top of the hill the huge truck shifted into high gear and roared down at 50 mph to climb the next hill. Delayed motorists speeded up to 60 to pass, lest they be delayed again. They took a chance—an unnecessary chance, but none took precautions to prevent a recurrence. No one took the license number and called the state police to slow the truck driver down to the 35 mph required by law.

The State Game Commission receives a letter stating that the writer saw a man kill a deer illegally, load it up to the trunk of his car, and haul it off. The writer signed his letter "A Sportsman." He neglected to give the name of the offender or the license number of the automobile. He did not offer to bear witness against the offender!

The driver was either drunk or a maniac for he ran around many automobiles on curves and hills. Oncoming traffic pulled off the road to prevent collision. Motorists who had just been passed by this menace saw him slow down and straighten up somewhat as he passed the state police headquarters and then renew his tactics. Not one of these indignant drivers stopped at the police station to ask that he be picked up before it was too late for someone.

A box had fallen off the top of a garbage truck and motorists rounding the curve had to either take the left side of the road or hit the berm to prevent running into the box. Many passed it up rather than stop and move it before an accident occurred. No doubt they complained that the State Road Commission should keep the highway cleaned up better.

Ordinarily, the individual knows his "rights" and generally claims even more. He knows he has a right to expect fair play and safe driving on the highway. He knows that he has the right to expect other sportsmen to abide by the game laws. Yes, he knows his "rights" but does he know his responsibilities as a citizen. Apparently he does not or if he does, then it must be admitted that, although he claims all rights, he shuns responsibility.

Has it always been customary for the public to shunt their responsibilities to law enforcement officers? Your editor does not believe so! He can remember when you would expect your neighbor to indict you for carrying a concealed weapon, for hunting out of season, for destroying property, etc. In those days when you violated the law, it was not sufficient to dodge the officers of the law-you also needed to dodge your neighbor, your friend, and all other citizens. A violation of the law was not a violation against the police but a violation against the public of which even your best friend was a part.

Taxes were low because few law enforcement officers were employed. Few employed because they were not needed. They were not needed because the citizens recognized their responsibilities as well as their rights.

Why did public apathy change and when? It seems to your editor that it changed with the coming of the 18th Amendment. It changed because a law was enacted with which the public in general was not in accord, and not prepared in their minds to enforce. It became unpopular to bring indictments against violators.

The same apathy is shown by most mine workers although your editor does not believe it is new. They seem to think that the sole responsibility of accident prevention belongs to maragement. They claim the "right" to a safe working place without accepting the responsibility of helping. The foregoing cases are hypothetical but will illustrate the point!

-Safety News Letter, Coal Division, EG&FA







OPERATING UNDERGROUND (left), new Hanna drill equipped with a 9-ft auger drills a hole in 50 sec. Drill head is hydraulically positioned and is mounted on a company-designed machine (right) similar to that built for its timbering machine.

Company-Built Unit Drills 9-Ft Hole in 50 Sec

A HIGH-SPEED DRILL capable of drilling a 9-ft hole in 50 sec has been designed by company engineers and built in the Central Shop of the Hanna Coal Co., Div. of Pittsburgh Consolidation Coal Co., Georgetown, Ohio. Prongs built into the drilling head as illustrated are forced against the coal to hold the unit rigid when starting a hole, thus eliminating use of a pick and permitting the driller to stay away from the face.

The new drilling unit, which is positioned by hydraulically powered controls, is mounted on a machine similar to that of a timbering machine recently developed by Hanna engineers. The single 9-ft auger permits drilling the full hole without stopping. The new unit, which has been under test at Willow Grove No. 10 mine, will replace a post-mounted drill previously used which had to be positioned by hand and utilized three 3-ft auger

While still in the experimental stage when described in the Hanna Cool News, the new drilling unit already had demonstrated considerable promise of greater efficiency and safety.

PRONGS ON END OF DRILLING HEAD hold the drill against the face and eliminate starting hole with a pick.





Magnetic Brake Makes Man-Car Safer

A NEW TYPE OF MAN-TRIP CAR, already installed at several mines of the Peabody Coal Co., Chicago, Ill., features a magnetic brake which automatically cuts in to stop the car if it breaks away from the hoist rope. Normal speed for the man-trip is 420 fpm and a governor actuates the brake at any speed over 475 fpm. Also, it can be manually operated by switches at each end of the car, if necessary.

Effective on dry or wet surfaces alike, the brake is similar to those used on trolley cars. The new cars are of allsteel construction and have individual bucket seats for 24 passengers.

CLYDE ASBRIDGE, shop foremen at Mine 43, Saline, Ill., Indicates with his rule the magnetic man-car breke, which has a 3x42-in gripping surface.

FOR ROOF DRILLING TOOLS



Style D-Auger Drill Bits carefully en-crimered for fast, free cutting with hand-held or machine drills. The rugged bit held or machine drills the rugged bit assures straight boles in hard, bony shale, slate, and other rock structures.



Style RD—Roof Drill Bits—ruggedly con-structed with the single, solid carbide blade for fast, earner drilling in hards formations of shee, slate and stratified andstone. If it can be Rotary Drilled—the Firthite RD bit will drill it.

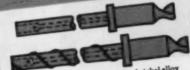


Style PD—Percussion Bits—expressly de-veloped for speedy, economical drilling of massive limestone, sandstone and other extremely abrasive formations.



FIRTHITE

The COMPLETE Line of Roof Drilling Bits... for ANY Roof Formation



Firthite Roof Drill Rods - made of nickel alloy Firthite Root Drill Rods — made of nicket alony steel rolled into seamless tubing with heavy duty wall thickness. Available in different shank styles to fit most any drill chuck.

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Mine Rig Slashes Drilling Time In Countersinking Trolley-Hanger Bells

THE RIG SHOWN HERE has greatly reduced the time and labor involved in countersinking trolley-wire hanger bells to provide additional clearance at the Elkhorn, W. Va., mine of the Crosier Coal & Land Co., a recent issue of Bits of News published by Kennametal, Inc., reports.

Previously, countersinking the hangers 3 in was done with a pneumatic drill. First, the bit was wallowed around the hole until it would accommodate the bell and then the hole for the expansion shell was drilled. Two men were needed to do the job, which required from 45 min to 1 hr per hole. In addition, the mine

motor was necessary to move the com-

pressor and trips sometimes had to be held up until holes could be finished and the drill moved out of the way.

With the new set-up, one man using a Nixon ratchet drill does the entire job, taking only 12 to 15 min per hole. The rig is easily moved and normal haulage is not interrupted. The holes for both the hanger bell and the expansion shell are drilled in one operation.

The bits used include a Kennametal SD 3½ bit for drilling the bell hole, into which a pinning rod is screwed to provide a 6½-in extension. A Kennametal HFD 1½-in bit inserted in the extension rod drills the hole for the expansion shell.



Plastic Cover for Shop Tests

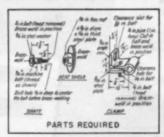
A PLEXIGLASS COVER shown on the main transmission case of a Goodman 360 loading machine is of considerable help to mechanics in adjusting the clutch and visually inspecting operation of these units after rebuilding in the Central Shop of the Hanna Coal Co., Div. of Pittsburgh Consolidation Coal Co., Georgetown, Ohio. As shown by D. P. Applegarth (left), foreman of the crew that developed it, the plastic cover is placed in a frame that can be attached to the gear case in the place of the regular steel-plate cover. Developed for shop use only, the cover permits visual inspection not possible with the regular cover, while protecting the gear case from foreign material during operation. The plastic cover has proved so helpful that it will be adapted to similar use on other machines in the shop wherever possible.

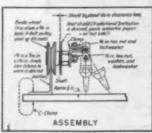
An Easy-to-Make Guide for Straight-Line Cutting



IF YOU DO a lot of straight-line cutting, you'll find this simple easy-to-make guide will help you cut straighter and faster, reports the Linde Tips, Linde Air Products Co., a Div. of Union Carbide & Carbon Co. The first step is to secure a 4-in steel or discast V-belt pulley with a %-in bore that will guide the attachment along a piece of angle iron.

NEXT MAKE the parts shown at right, following the sketches carefully. The shaft is a %-in machine bolt braze-welded to a steel washer. A steel disc serves as a heat shield and the





clamp is made from ¼-in pipe braze-welded to two extension pieces.

THEN ASSEMBLE the parts this way (left). There should be about ½s-in clearance between the heat shield and the hub of the pulley to provide easy rolling. For assembly, you'll need two ½-in hex nuts and lockwashers and a plain washer.



IN USING THE GUIDE, keep the pulley at right angles to the work as illustrated above. File the top edge of the angle iron to provide an even smooth-riding surface for the pulley.



Shoes Make Trolley Wire Last Longer

If wire wear is a problem you'd like to lick, put O-B Trolley Shoes on all of your locomotive trolley poles. That's the best way to cut down on arcing and wireburning—the cause and result of poor current collector performance. Shoes will do it for you, because they don't bounce from the wire as they pass over they don't bounce from the wire as they pass over arcs are drawn between the wire and the collector, and so there's no wire-burning to cause pitting or the build-up of lumps on the wire surface.

Wheels, on the other hand, can't pivot when they hit a bump, so they bounce, draw arcs, and cause more bumps for the next collector to encounter. Then there's more bumping, more arcing, and more wire lost through wire-burning. It's a vicious cycle!

Shoes.-O-B Trolley Shoes.-cre the best solution to the problem of wire wear. For regular service, there's the Type-L, and for currents in excess of 2,000 amperes, the Type-M Shoe is best. Use them both to keep your trolley wire in good condition!

OHIO, U. S. A





"New, Better

Mechanized Mining

"Complete New Line of **O-B Motor Starters Covers Every Application in** Gaseous Areas or Good Air"

With these five new O-B motor starters--open type and gas-proof--you can now provide the best possible protection for any of your 230- and 550volt dc motors ranging from 5 to 75 horsepower. Without good starter performance, even the best mechanical equipment can't do a job for you. That's why your investment in mechanical mining deserves the best possible protection against electrical breakdown.

Long after they've proved their worth in keep-



Principal Uses

Pump Service. Can be connected for remote control or float switch operation.

Compressors, hoists, conveyors and similar equipment where reversing switch is not needed.

Supplied for 230- and 550-volt de motors ranging from 5 to 25 hp inclusive.



Principal Use: Conveyor Service. Can be connected for re-mote control or float switch operation, and for interlocking sequence control of con-

Other Uses: Pumps, Compressors, Hoists.

supplied for 230- and 550-volt dc motors ranging from 5 to 25 hp inclusive. Accessories

BF-3



Belt Conveyors. Can be connected for interlocking sequence control of conveyors.

Supplied for 230- and 550-volt dc motors ranging from 10 to 25 hp inclusive

Accessories:

Standard accessories are available.

Ohio Brass Company, 380 North Main Street Mansfield, Ohio

Address

I'd like more information about the starters which I've circled here: AF, BF, BF-3, BH-4, BFG.

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Company....

City

BFG

Conveyor service in gaseous areas. Can be connected for re-mote control or float switch operation.

Fan. Pump and Compressors.

Supplied for 230- and 550-volt dc motors ranging from 5 to 25 hp inclusive.

Accessories

Protection for

Equipment

ing equipment on the go--when routine maintenance becomes necessary--your electricians will appreciate their simple arrangement for quick service. And wherever they're used, the rugged cases, switches and contactors will prove that O-B starters are built for hard mine use.

Why not get the complete story on any or all of the starters in O-B's complete new line? Just fill in the coupon and mail it to let us know what starters you're interested in.



Principal Use:

Belt Conveyors. Can be connected for interlocking

Pumps and other equipment within horsepower

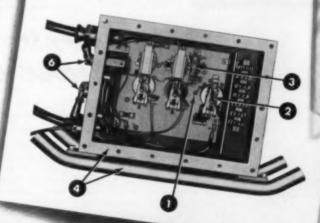
Supplied for 230- and 550-volt dc motors ranging from 30 to 75 hp inclusive.

Accessories

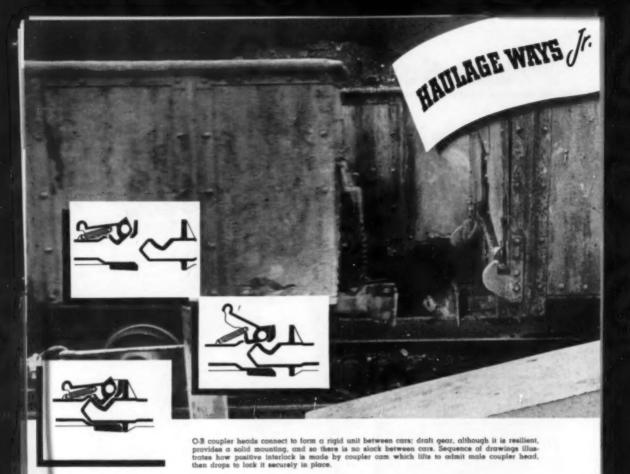
Standard occurranties are available

SIX IMPORTANT REASONS WHY O-B STARTERS MEAN Better Mining

- 1. Ample room between contactors makes Ample toom between confectors mores service and maintenance simple. Each connervice and maintenance simple. Each con-tactor can be completely serviced without disturbing adjacent units.
- Contactors stand up under hard mine use. Sturdy parts assure long life; easy access to coils without use of tools.
- 3. Overload relay in one self-contained unit.
- 4. Strong case and skids stand up under years
- 5. BFG is explosion tested by U. S. Bureau of Mines and carries letter of suitability.
- 6. Foolproof interlock between control switch







For Slack-Free Trips You Need Positive Interlock between care

Damage from bumping and backlashing between cars causes repair work and lost time that can be avoided if link-and-pin hitchings are replaced with slack-free O-B Automatic Mine Car Couplers. Higher haulage speeds are practical when play between cars is eliminated; so are bigger loadings and longer trips. Here is one of the reasons why these operating advantages are possible.

O-B coupler heads come together in a snug fit to make one rigid unit of the two heads. A coupler cam locks the heads so that the face of one bears tightly against the face of the other. The cam seats itself more firmly in its coupler-locking position as the pull between the couplers increases. This positive interlock between cars prevents backlash and keeps cars in center-to-center alignment.

To provide the necessary "give" in the coupler mounting, both coupler heads are mounted against a resilient rubber draft gear. Thus blows are absorbed without damage to car or coupler.

Take up some slack in your haulage system with new O-B Automatic Couplers. We'll be glad to answer your questions about specific installations!

4092-M



Diesel Engine Drives Spare Fan If Power Fails





TWIN FAN INSTALLATION, one fan operating on electric power and the other a stendby with diesel drive, supplies air to two mines that produce about 4,000 tpd. Doors on evese ducts (right photo) are opened on operating fan and closed on idle fan by air pressure.

ELECTRIC-POWER FAILURE or mechanical difficulties with the ventilating fan at Summerlee and Lochgelly mines, The New River Co., Mt. Hope, W. Va., will not disrupt mine ventilation, because one of the 9-ft Jeffrey Aerodyne fans in this twin installation is equipped with a diesel drive and serves as a full-scale spare. Previously, both fans were required to ventilate the workings and both were driven by 200-hp electric motors, but now one fan is able to do the job. The electric drive for the spare fan was replaced by a 6-cylinder 295-hp diesel engine, which is connected to the V-belt pulley shaft through a Cotta friction clutch.

An immersion-type electric heater, in the hose between the radiator and block, keeps the engine at 170 deg so the attendant can start the unit with only a few revolutions of cranking. The attendant lives near the fanhouse, and his duties also include starting and inspecting a nearby vertical-turbine pump.

A 200-hp Westinghouse motor shown above (right), operating on 4,160 v at 890 rpm, drives the operating fan, which supplies 212,000 cfm at 3.4-in wg.



DIESEL DRIVE (left) on spare fan features electric heater between radiator and block for easy starting in emergencies. Main fan supplying 212,000 cfm is driven by 200-hp electric motor (right) through V-belt drive.

IF YOU'VE FIGURED out a good
"Operating Idea," tell COAL
AGE about it. We gladly pay
for items published.





Timber-Truck Chains Tighten Easily And Stay Put With This Attachment

CHAINING TIMBERS on a timber truck for transportation into the mine often was a difficult and unsatisfactory job before addition of an attachment developed by Edward B. Shaw, blacksmith, Williams mine, Consolidation Coal Co. (W. Va.), Div. of Pittsburgh Consolidation Coal Co., Enterprise, W. Va. It was difficult to tighten chains sufficiently and they were often lost as well.

It's a different story now that a

chain with a bolt and ratchet attachment shown by Mr. Shaw (right) is permanently fastened to the timber truck. The chain is very simply tightened and it stays right with the truck wherever it goes.

Mr. Shaw's ingenuity in developing this and other "inventions" was recognized recently with presentation of a savings bond at one of the company's dinners held for mine supervisory personnel.





LAMPS AND SEMAPHORE ARM indicate switch position, with heisting engineer getting right view of the signal (errow).

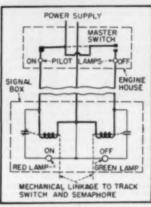
Hoisting Engineer Controls Main Track Switch

SMOOTHER HOISTING and less legwork for the slope-head attendant are benefits of a track-switch control installed at Brilliant mine, The Kemmerer Coal Co., Frontier, Wyo., by Henry Garnick, master mechanic. The main switch at the slope mouth now is controlled from the engine house by the boisting engineer.

Previously, the head attendant waited at the switch for a trip to be hoisted, then he threw the switch to permit the trip to be lowered to the car dump. Also, when the trip was dumped he would return to the switch to open the alone road.

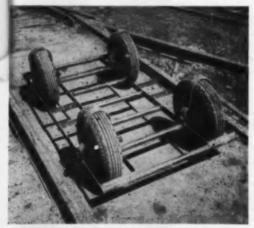
Mr. Garnick's track switch monitor is illustrated in the accompanying schematic diagram. The motion required to throw the switch is provided by two salvaged solenoids, one for each direction of motion of the switch. Power is directed to either solenoid by the hoisting engineer, who has a master switch on his control panel. When either coil is energised its armature pulls the track switch into the desired position through mechanical linkage, which also operates a semaphore arm to give a visual check on the position of the track switch.

The solenoids also control secondary lamp circuits in the signal box, thus providing an indication of track switch position at night. For example, with the red lamp lighted the switch is thrown to the car dump; but with the green lamp on the slope road is open.



WIRING DIAGRAM for "Garnick" control of main-track switch.

Supply Cart on Bottom Replaces Dolly in Pan Line



RUBBER-TIRED PUSH CART, with underslung frame, offers definite advantages over pan-line dollies in handling supplies at Rook Cove.

LIGHT WEIGHT and a low akeleton-type bed are the advantages of a supply truck designed and built in the Reels Cove mine shop of the Tennessee Products & Chemical Corp., near Whitwell, Tenn. This mine, working in 38-in coal, loads with power duckbills, and trucks of this type are used for carrying shaker pans, timber and other supplies from the cross belt to the room faces.

supplies from the cross belt to the room faces.

Wheels are stationary (non-steering) and the axies are fastened to inverted stirrups which carry the underslung frame. Cross members are sections of 1-in pipe, and the longitudinal pieces are % x 1½-in bars. In loading the cart, one or two pans are placed on the bed and then filled with posts and other supplies. The cart is guided by skidding.

The rubber-tired cart, pushed or pulled along the mine bottom, has been found far superior to the method first used, which consisted of a dolly riding in the pan line. Delays in emptying the pan line now are avoided, and maintenance of equipment also is reduced because the detrimental shaking of a practically empty line is eliminated.

Mobilizing Mine Equipment

THE URGENT CALL is for more mine output.

It's demanding optimum capacity from every piece of equipment, with downtime cut by more efficient maintenance. This new pressure for production has turned many additional operators and operating men to Cities Service lubricants because

1st—The complete Cities Service line affords correct lubricants to stand the gaff, in even the hardest-worked equipment.

2nd—The alert, substantial Cities Service organization merits the same complete confidence as these lubricants.

3rd—Cities Service stands ready with competent technical aid, especially capable of ironing out lubrication difficulties.

You can cut time and costs on the job; you can cut lost motion in ordering and delivery, by concentrating responsibility on Cities Service. The line is complete. The quality is always tops.

For further information about our technical aid write CITIES SERVICE OIL COMPANY, Room 898, Sixty Wall Tower, New York City 5. Or call your nearest Cities Service office.

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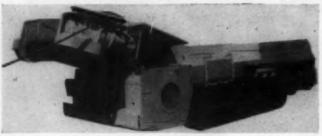
AMC Equipment Show Report-Continued From P 118



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Joy diesel-electric shuttle car.





General Electric crawler-tread shuttle car.

with electric cars. The exhaust is fitted with a Bureau-of-Mines approved-type scrubber. Features include 2-wheel variable-speed drive; manually operated 4-wheel hydraulic brakes; electric brake for retarding downgrade; 2-wheel hydraulically boosted steer; 15-hp traction and conveyor motors; General Motors 3-cycle 2-cycle 82-hp diesel engine with 50-kw generator; height, 60 in; wheelbase, 9 ft 11 in; outside turn radius. 25 ft 9 in; conveyor width, 40 in; weight, 29,700 lb; capacity, 285 cu ft, or 14 tons maximum; maximum speed, 8 mph.

(83) Koppers Co., Inc., Pittaburgh 19—Pressure-treated ties, Ar-Moored ties, combination steel and pressuretreated wood ties.

(84) Mosebach Electric & Supply Co., Pittsburgh 8—Grease-type brake adjusters.

(85) Nachod & United States Signal

Co., Louisville, Ky.—Automatic block and highway crossing signals set and cleared automatically by the trolley wheel or shoe; new directional contactor for mounting under feeders; new Nusco block signal designed for merely unplugging for renewing mechanism and units and featuring dust-tight construction; and new Simplon nondirectional contactor for turning light red following passage of trip.

(86) National Malleable & Steel Castings Co., Cleveland 6—NC-1 minecar truck; Willison automatic couplers; Sharon 10 couplers; M-230 rubber-cushioned draft gear for rotary-dump cars; M-225 rubber-cushioned draft gear for locomotives and large non-rotary-dump cars; self-centering Willison automatic couplers and integral National MI-235 twin-application rubber draft gear for drop-bottom cars; new-type rubber-cushion

draft gear; swivel and link hitchings; mine-car wheels.

(87) National Mine Service Co., Beckley, W. Va.—New National diesel locomotive approved by the U. S. Bureau of Mines for underground service. Features include: weight, 10 tons; height, 45½ in; length, 17 ft 3 in; width, 5 ft 6 in; track gage, 42 to 48 in; wheelbase, 75 in; Hercules 6-cylinder diesel engine with Twin Disc torque converter; Westinghouse air brakes; air sanding; dynamic braking through compression; Timken journal boxes; all-welded frame.

(88) Nolan Co., Bowerston, Ohio-NL5N Porta-Feeder for trip and car feeding; Nolan rerailers and car blocks; rotary dumps.

(89) Ohio Brass Co., Mansfield, Ohio—O-B Form-8 and Form-9 automatic mine-car couplers. Form-9 are air-connecting couplers for cars equipped with air brakes.

(90) Rydin Ry. Equipment Co., Chicago 4—Ryd-in automatic couplers in two sizes, featuring strength for the job, instant positive engagement without manual assistance, and interchangeable coupler bodies.

(91) Sanford-Day Iron Works, Inc., Knoxville, Tenn.—Latest-type 4-ton drop-bottom car featuring improved structural design, sealed-door construction to prevent spillage, and double latches on doors for greater safety; also S-O automatic closing and tripping equipment.

(92) Sterling Steel Casting Co., E. St. Louis, Ill.—Full line of Sterling cast-steel mine-car wheels equipped

Matthews, Moore Coal Co. Supt. reports bit cost of .28 of one cent



Mr. Claude Matthews, superintendent, Moore Coal Co., Devonia, Tenn. reports that heavyduty Kennametal Bits have saved

money on cutting time, machine repair, and bit costs. Seventy-five heavyduty bits cut 2,400 places. Bit cost was reduced to .28 of one cent. A saving of 29% was made on power which lowered upkeep cost on mining machines.

Grinding Folder Available ... FREE



Kennametal Inc., Latrobe, Pa. has fully-illustrated folder offering complete details on how to PROPERLY and economically keep

cemented carbide mining machine bits in top cutting condition. Special features: Step by step instructions on grinding, how to tell when bits are dull, how to avoid bit chipping, and what causes carbide bits to crack.

43% decrease in power



Power test developed in a Raleigh County, West Virginia mine shows that Kennametal U-8 (heavy-duty) bits required just

57% as much power as the two different styles of steel bits that were tested. Readings were: Steel Bit Y-.40 KWH per ton, Steel Bit Z-.48 KWH per ton, Kennametal U-8-.25 KWH per ton. Test conditions were identical.



Power Problem

(Y) compare? Ins.: X=37 H.P./pluce Ans.: X = 37 H.P./place Y = 52 H.P./place X/Y = 37/52 x 100 = 71% (% X/Y = 37/52 x 100 = 71% or X bit needed by X bit) or X bit

The problem at the left was solved for Claude Matthews, Supt., Moore Coal Co., Devonia, Tenn., by an engineering company that computed the power requirements of steel bits and Kennametal bits. Results showed that steel bits placed 104% of rated load on the machine motor while Kennametal bits required only 75% of rated load.

Kennametal bits save power because they are tipped with Kennametal cemented carbide. It is a cutting edge material that stays sharp 50 to 200 times as long as steel. That is what makes Kennametal the greatest power saving bit in the coal field.

Some mines save as much as 5 and 6 cents per ton on Kennametal bits. These savings are divided up among the amount of bit changing, reconditioning time, bit cost, and repair cost that are saved. Numerous power tests like this one prove that Kennametal bits save 25 per cent or more on power. And power checks are one of the most definite indexes on savings that it is possible to make.

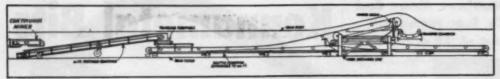
Let a Kennametal representative give you FREE proof that Kennametal bits can mean big savings to you. He specializes in cutting and drilling -is also a likable man with years of experience in the mines.

Contact him today by writing Kennametal Inc., Latrobe, Pa. A postal card and three words, like "send a representative" -- your signature -will do the trick. No obligation!

DRILL BITS . MACHINE BITS . STRIP BITS . ROCK BITS

Write us for any information you want on Cutting or Drilling

American Mining Congress Equipment Show Report



Hewitt-Robins belt-type shuttle conveyor.



Joy extensible belt conveyor.



Joy shaker-bolt conveyor with stainless-steel belt.

with Sterling permanent grease seals and bearing-adjustment and locking device, and featuring Sterling's balanced design for greater service with reduced maintenance for cars, wheels and trucks.

(394) Tool Steel Gear & Pinion Co., Cincinnati 16—"Tool Steel" mine-car wheel.

(93) Watt Car & Wheel Co., Barnesville, Ohio.—Southwest Potash Corp. 400-cu ft 8-wheeled car for rotarydump service, featuring National Malleable trucks, cast-steel wheels, rubber draft gear, and Willison couplers. Car height is 42 in; width, 90 in; length inside, 21 ft; gage, 48 in; total weight, 10,800 ib.

(94) Westinghouse Electric Corp., Pittsburgh 30—Latest-type 15-ton "Lo-Liner" locomotive built for Boone County Coal Corp.

(95) West Virginia Steel & Mfg. Co., Huntington, W. Va.—Prefabricated track with switches equipped with special rerailers, standard mine ties, composite wood-steel ties, light and heavy switch stands, redesigned manganese-steel frog, new heavy cam-motion switch stand (Design No. 11) and new hydraulic rail bender.

Features of the new switch stand include: parallel throw, use with rails weighing 60 lb or more per yard, low height, self-locking in thrown position, exceptionally wide base, disassembly by removing two cotters, and throw adjustment through adjustables.

screw-eye crank arm.

Features of the new hydraulic rail bender include aluminum-alloy body

and yoke, a weight of 45 lb with no more bulk than the average mechanical bender, hardened adjustable screw and protected release valve. The bender illustrated is intended for 25- to 40-lb rail and will exert a pressure of 30 tons.

Mine Conveyors and Belting

(96) Armstrong-Bray & Co., Chicago 30—Belt aplicers and hinged Plategrip fasteners featuring a new armored-cable rocker pin for connecting splices that seats itself and will not rock out; also improved tools for applying fasteners.

(97) Barber-Greene Co., Aurora. III.—B-G conveyors of all types, including the new Type 366 rubber-tired portable mine conveyors with 20-ft-long 24-in belta and designed for use in series behind continuous mining machines (Coal Age, March, 1951).

(98) Flexible Steel Lacing Co., Chicago 44—Flexco belt fasteners, including Flexco hinged fasteners, and Alligator wide-belt cutter for cutting belts of all widths.

(99) Goodman Mfg. Co., Chicago— L-20 low-height underneath shaker drive with built-in motor and columntype pan line; E-11 shaker drive with Size O pan line; Type 99-6-A5-36 heavy-duty belt conveyor.

(100) Hamilton Rubber Mfg. Cerp., Chicago 7.—Hamilton King Koal conveyor belt.

York—New rubber-tired belt-type



Talcott Acme patch fasteners.

shuttle conveyor with fixed discharge for use behind continuous-mining machines.

(162) Irwin Foundry & Mine Car Co., Irwin, Pa.—Self-lubricating reversible belt conveyor unit-constructed for easier transportation.

(103) Jeffrey Mfg. Co., Columbus— Train of Molveyor units (rubber-tired sectional belts in series for use behind Colmols) (Coal Age, May, 1951).

(104) Joy Mfg. Co., Pittsburgh—12-FA chain conveyor, USN-17 shaker conveyor, new shaker-belt conveyor and new extensive belt conveyor. The SB-24 shaker belt is described as an extensible unit for operation up to 450 ft with 20-in drum and ideally suited to panel haulage. The trough line is a stainless-steel strip. Light weight permits long downgrade operation. Features are: drive, 15 hp; capacity, 35 to 120 tph; maximum recommended length, 1,000 to 1,500 ft; belt widths, 24, 30 and 36 in.

The 2-PEC extensible belt conveyor, according to the company, is a self-propelled unit for operation behind a continuous miner. The drive section contains enough belt for a 60-ft extension. Features include: automatic extension and tension control; 15-hp conveyor drive; 8-hp self-propelled head and tail sections; 4-hp hydraulic pump motor; 24-in belt; 350-fpm belt speed; 4-tpm capacity; maximum recommended length, 1,200 to 1,500 ft.

(105) Link-Belt Co., Chicago 9— L-B conveyors and conveyor idlers.

(106) Long Super Mine Car Co., Fayetteville, W. Va.—New 400-R room conveyor and new Piggyback continuous-transportation system for mechanical loaders and continuous minora.

(107) Michigan & Southern Equip-



ABC inflatable brattice.



Caterpiller DW21 tractor and scraper.



Gorman-Rupp 9264-A self-priming pump.

ment Co.. Columbus 16—Bonded Scale conveyors, idlers and parts; N. Y. Rubber Corp. conveyor belting.

(108) National Mine Service Co., Beckley, W. Va.—Hayden conveyorbelt fastening system.

(109) Quaker Rubber Corp., Philadelphia—Conveyor belta, including the new Ebonite type.

(110) Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.—Various types of coal-mine belts equipped with various fasteners, including the new Ray-Man "F" conveyor belt, featuring greater flexibility and troughability, higher resistance to shock, higher resistance to ripping and puncturing, exceptional fastener-holding ability, better adhesion of covers to strength member, synthetic-fiber plies for necessary elasticity, mildew proof, and same price as conventional duck belts for same rated strength. The belt may be made endless in the field.

(111) W. O. & M. W. Talcott, Providence, R. I.—Talcott conveyor fasteners and Talcott Acme patch fasteners.

(112) U. S. Rubber Co., Mechanical Goods Div., New York—Conveyor belting, featuring treated cotton-nylon high-strength belts; also splicing and repair with portable vulcanizers.

Pumping and Drainage

(113) Allis-Chalmers Mfg. Co., General Machinery Div., Milwaukee, Wis.—Close-coupled "Electrifugal"; rubber-lined and other pumps.

(114) American Car & Foundry Co., Valve Div., New York—ACF "Pull Area" lubricated plug-type valves, including mounted semi-steel valve with an air-operating automatic cylinder attached.

(115) Armeo Drainage & Metal



Euclid "Twin Power" scraper.

Products, Inc., Middletown, Ohio— Pipe-Arch drainage pipe, corrugated and spiral-welded pipe, Hel-Cor pipe.

(116) Brown-Fayre Co., Johnstown, Pa. — Latest-type Austin-Brownie mine gathering pump, and new "Surfio" Model 100 strainer-foot valve for use with centrifugal pumps and featuring round bottom and a new design for high-efficiency sludge collection.

(117) Carlon Products Corp., Cleveland 5—Various types of Carlon fiexible plastic pipe and fittings; new Carlon TL rigid plastic pipe and fittings for borehols and other use, featuring light weight and resistance to rot, rust and electrolytic erosion; new-type molded-insert couplings and adapters up to 6 in.

(118) Deming Co., Salem, Ohio— Pumping equipment, including deepwell-turbine pumps, Fig. 1896 "Oil-Rite" double-acting pump, and Fig. 3312 self-priming pump; Deming spray nozales.

(119) Flood City Brass & Electric Co., Johnstown, Pa.—Mine pumps, including 2½x3 plunger pump with reversible water end recently developed.

(120) German-Rupp Co., Mansfield, Ohio—Centrifugal pumps, self-priming pumps for stripping service, and new Model 9264-A 2- and 3-in self-priming pumps featuring lower-horse-power requirements. The 2-in unit for example, gives the same results with a 3-hp motor as formerly attained with 5-hp model, the manufacturer states. The pumps are adaptable to use off shift, since, among other things, they run without water in the casing and stay cool without damage.

Simplicity is another feature stressed by Gorman-Rupp.

(121) Johnson Plastic Corp., Chagrin Falls, Ohio—Complete line of Johnsonite flex'ble plastic pipe and fittings for acid-water and other mine use; new line of Johnsonite rigid corrosionproof plastic pipe that can be threaded with standard equipment.

(122) National Tube Ca., Div. U. S. Steel Co., Pittsburgh 30—Pipe and tubing for mine application.

(123) Raybestes - Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J. —Homoflex hose.

(124) Victualic Co. of America, Elizabeth, N. J.—Victualic couplings and hand- and power-operated pipe groovers.

Ventilation

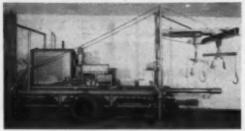
(125) American Brattice Cloth Co., Warsaw, Ind.—Mine-Vent tubing, ABC brattice cloth, and a new inflatable brattice for fast temporary stopping of crosscuts.

(126) Bemis Bro. Bag Ce., St. Louis 2—Flexipipe "Original" ventilating tubing.

(127) Armco Drainage & Metal Products, Inc., Middletown, Ohio— Armco fan duct; Armco pipe for airways and crosscuts.

(128) Clarkson Mfg. Co., Nashville, Ill.—Clarkson double-swing doubledoor hinges for shuttle-car doors, including cable protector.

(129) John Flocker & Co., Pittsburgh 30—Firestone plastic brattice sheeting sewn with nylon thread to prevent mildewing.



Cardox 135-hp surface-recevery drill.



Jey AD-3 highwall-recovery augor.



Hawthorne DB bit assembly.

(130) Fulton Bag & Cotton Mills, New York 17—Blaze Braker and FFFF brattice cloth.

(131) R. M. Hollingshead Corp., Camden 2, N. J.—Cocoon vinyl-plastic sealing of stoppings and overcasts (Coal Age, March and April, 1951).

(132) Jeffrey Mfg. Co., Columbus-Type 12-A 6-ft Aerodyne fan; Aero dyne Midget blower.

(133) Joy Mfg. Co., Pittaburgh— Axivane high- and intermediate-pressure mine fans; I-16 and I-19 portable blowers.

(134) Manu-Mine Research & Development Co., Reading, Pa.—Paste compound for air and water sealing of stoppings, brattices, mine doors and air shafts.

(135) Upsen-Walton Co., Cleveland 13—"Dry-Proofed" flameproofed brattice cloth in standard and heavy weights.

Stripping

(136) Aero Service Corp., Philadelphia 20—Photo-reconnaiseance and aerial mapping.

(137) American Brake Shoe Co., American Manganese Steel Div., New York—Hard-faced, replacement parts for digging edges of stripping units.

(138) American Cyanamid Co. Explosives Dept., New York—Strip-mining explosives.

(139) Atlas Powder Co., Wilmington 99, Dela. — Rockmaster short-delay shooting with detonators in 16 different relay periods; new adjustable galvanometer for circuit-testing.

(140) Austin Powder Co., Cleveland
-New plastic water-resistant all-pur-



Mobile Drilling Co. tractor-mounted auger.

pose fuse; 6- and 9-in tungsten-carbide drill heads.

(141) Baldwin-Lima-Hamilton Corp., Lima-Hamilton Div., Lima, Ohio— Shovels and draglines.

(142) Bucyrus-Erie Co., S. Milwaukee, Wis.—30-yd dragline bucket for use on 1250-B dragline, usually with 200-ft boom. Features include wide opening (13 ft outside) and curved manganese-steel lip for quick filling. Also featured were power shovels and draglines from % to 36 cu yd, and blasthole drills.

(143) Cardox Corp., Chicago—New 60- and 135-hp aurface-recovery drills. The 60-hp machine makes holes up to 30 in in diameter. Auger speed is 50 rpm; total weight, 3,500 lb; overall length, 13 ft 4 in; width, 7 ft; overall height, 6 ft plus auger-handling derrick. The 135-hp machine drills holes up to 48 in. Auger speed is 50 rpm; total weight, 6,500 lb; overall length, 14 ft 10 in; width, 7 ft; overall height, 6 ft plus auger-handling derrick.

(144) Caterpillar Tractor Co., Peoria, Ill.—New DW21 tractor and scraper.

(145) Chicago Pneumatic Tool Co., New York—CP air drills in various sizes and styles.

(146) E. I. du Pont de Nemours & Co., Inc., Wilmington 99, Dela.— Nitramon and du Pont Red Cross Extra explosives, and du Pont Primacord MS connectors for delay shooting (see p 86 of this issue). (147) Electric Steel Foundry Co., Portland, Ore.— Esco dragline buckets and shovel dippers; Esco box-type points and adapters for all types and makes of buckets and designed to permit changing points in 5 min; manganese-steel dozer blades and alloy blades and bits; Esco manganese-steel dragline-bucket fittings, including new-type "Long Bowl" rope socket designed to minimize cable wear and permit utilization of up to 90% of cable strength.

(148) Euclid Road Machinery Co., Euclid 17, Ohio—New "Twin Power" 18-cu yd scraper available with either 175-hp General Motors or 190-hp Cummins engines on both front and rear, with top speeds of 24 or 29½ mph, respectively.

(149) Harnischfeger Corp., Milwaukee, Wis.—P & H stripping shovels and draglines featuring Magnetorque drive.

(150) Herb J. Hawthorne, Inc., Houston, Tex.—Hawthorne replaceable-blade exploration bits, with selfsharpening tungsten - carbide - faced throwaway blades. Sizes are 1% through 10 in.

(151) Hendrix Mfg. Co., Inc., Mansfield, La.—Type HS 3½-yd heavyduty dragline bucket especially designed for moving shale or any hard formation.

(152) Hercules Powder Co., Wilmington, Dela.—Hercules strip-mining explosives and blasting supplies.

(153) Joy Mfg. Co., Pittsburgh— Joy Champion continuous blasthole drill (Coal Age, February, 1961), and the new Joy AD-3 highwall-recovery drill. Features of the latter machine include 24 or 30-in auger 4 or 6 ft long; maximum chuck feed of 7 ft; auger speed of 75 rpm; thrust through chuck of 9,500 lb; 6,000-lb winch pull; 100 ft lateral travel of machine on undercarriage; 75-hp diesel engine; and 32-volt starting.

(154) Kennametal, Inc., Latrobe, Pa.

--Kennametal drilling tools.

(155) Kensington Steel Co., Chicago 28—Dipper-tooth points and bases, crawler treads, idlers, drive sprockets and other parts for stripping and loading shovels.

(156) LeRoi Co., Cleveland Div., Cleveland—Rock drills and portable compressors for pit service.

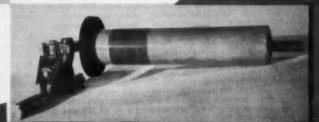
NEWS!

M INING MACHINE PARTS INC., of Cleveland, for many years a manufacturer of quality replacement parts for underground coal loading equipment, has been made national sales agent for the JAB Company Inc., of Ebensburg, Pa.

JABCO is producing a line of improved products for more efficient mine operation.

This line includes hook clamp trolley taps, ground clamps, cable connectors, Junior trolley taps, plain hooks, and fuseless taps.

Write for Catalog No. 551 and price list.



STOR ST. CLAIR AVENUE . CLEVELAND 3, ONIO



Hough Model T12 Payleader.



International Harvester tractor with Lodover.

(157) Link-Belt Speeder Corp., Chicago 9—L-B Speeder shovels and draglines in capacities of ½ to 3 yd equipped with Speed-O-Matic hydraulic controls for finger-tip operation and elimination of operator fatigue.

(159) Marion Power Shovel Co., Marion, Ohio—Stripping and loading equipment, including the 7400 walking dragline.

(159) Mobile Drilling, Inc., Indianapolis, Ind.—New one-man-operated slotting-auger-type drill for mounting on rubber-tired tractor with power takeoff for hydraulic feed for drilling coal; new P-40 self-contained drill on rubber-tired tricycle mounting, with hydraulic feed and 5-hp Wisconsin engine; latest-type B-36 drill mounted on and powered by 4-wheel-drive jeep for either horizontal or vertical drilling; latest-type B-56 drill mounted on 1-ton or larger truck equipped as complete drilling unit, with hydraulic feed from power take-off.

(160) Northwest Engineering Co., Chicago 3—Northwest shovels and draglines.

(161) Osgood Co. and General Excavator Co., Marion, Ohio — %- to 2%-yd shovels and other excavating equipment, including rubber - tired clamshells.

(162) Olin Industries, Inc., E. Alton, Ill.—Western Cartridge blasting caps and Equitable, Liberty, Egyptian and U. S. explosives.

(163) Page Engineering Co., Chicago 38—Page Automatic dragline buckets with new-style riveted lip and riveted patch plates.

(164) Reich Bros. Mfg. Co., Terre Haute, Ind.—Drilling and prospecting equipment.

(165) Salem Tool Co., Salem, Ohio— 36-in coal-recovery auger; highwall drill applicable either to horizontal or vertical drilling with 6- to 8-in augers and available as either a self-propelled or truck-mounted unit; Salem augers, tamping poles, bit seats and special drilling heads.

THE POSTAGE-FREE CARD facing p 140 will bring you more information about the items in this Coal Show Report.

Tractors and Tractor-Loaders

(166) Allis-Chalmers Mfg. Co., Tractor Div., Milwaukee 1, Wis., in conjunction with Baker Mfg. Co., Tractomotive Corp., and Gar Wood Industries, Findlay Div.—New complete line of crawler tractors, as follows: HD-20G powered by General Motors 175-hp 6-cylinder engine with hydraulic torque-converter drive and mounting a 4-cu yd Tractomotive TS-20 Tracto-Shovel (also available with 7-cu yd light-material bucket or with bucket teeth for digging, and successfully adapted to direct loading of coal without shooting); new HD-9 and HD-15 tractors equipped with Baker bulldozers (Coal Age, January, 1951); HD-20 tractor equipped with 25-cu yd Gar Wood 625 scraper; HD-5 tractor with rear-mounted Tractomotive hydraulically controlled ripper designed so that tractor weight holds ripper down: new Tractomotive TL-10 Tracto-Loader, a rubber-tired unit with hydraulic torque converter and clutchtype transmission and mounting a %cu yd frontend bucket: Allis-Chalmers Model D road maintainer with utility rear-end loader.

(167) Caterpillar Tractor Co., Peoria, III.—D7 diesel tractor with Traxcavator, D8 diesel tractor with new 8U bulldozer, Hyster D8L towing winch, D7N towing winch, No. 12 diesel motor grader, new DW20 tractor with W20 bottom-dump wagon, Athey 54-in-wide 1-cu yd rock bucket for heavy excavation.

(168) Frank G. Hough Co., Libertyville, Ill.—New Model T12 Payloader a track-type tractor-shovel featuring a 1-cu yd bucket built into the tractor, with engine rear-mounted for better balance and stability and available with either gasoline or diesel engine; also 1½-cu yd Model HM, 1¼-cu yd HY and %-cu yd HF Payloaders.

(169) International Harvester Co., Chicago 1—TD-9 crawler tractor equipped with new Service Supply Lodovyr combination 1-cu yd overhead and front-end shovel, said to offer fast dumping without turning and facilitate loading with less maintenance and wear on the tractor and treads; TD-24 diesel crawler tractor developing 148 drawbar horsepower and equipped with Bucyrus-Erie Bullgrader.

(170) R. G. LeTourneau, Inc., Peoria, Ill.—Model Super C Teurnadozer featuring new finger-tip control and "down-pressure" arrangement for tilting blade on either side and exerting pressure to keep blade in material; also new Tournaschneider torque converter.

Trucks and Engines

(171) American Steel Foundries, Chicago 11—ASF fifth-wheel tractortrailer coupler with stabilizers to control oscillation; ASF-Linco "Level-Load" axle.

(395) Ashland Oil & Refining Co., Ashland, Ky.—Diesel fuel and gaso-

(172) Buda Co., Harvey, Ill.—Three new DA Dyna-Swirl diesel engines; 6-DAS-844 supercharged, 6-cylinder, 280 hp; 8-DAS-1125 supercharged, 8cylinder, 350 hp; 6-DA-844, 6-cylinder, 215 hp.

(173) Calcium Chloride Association, Washington 6—Calcium-chloride base and surface stabilization for haulage roads.

(174) Caterpillar Tractor Co., Peoria, Ill.—New D397 industrial engine, new D337 and D397 diesel engines, Athey PD-20 rock wagon.

(175) Cummins Engine Co., Columbus, Ind.—Four light-weight, high-speed high-brespower Cummins diesels: 150-hp JS-600, 300-hp NHRS-600, 550-hp NVHS-1200, and NHIS-600 torque-converter package unit, 300 hp at 2,100 rpm.

(176) Dart Truck Co., Kansas City, Mo.—Off highway haulage equipment, featuring Dart planetary-geared axle with capacities up to 75,000 lb.

(177) General Meters Corp., Detroit Diesel Engine Div., Detroit 28—Series 71 3-cylinder engine, 100 hp at 2,000 rpm; Series 71 6-cylinder engine,

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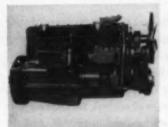
Sales Offices: Pittsburgh, Pa. * Bluefield, W. Va. * Scranton, Pa. * Chicago, III. * Pottsville, Pa. * Maynard, Mass.



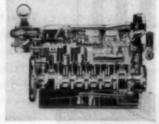
Bird Machine Co. "Polisher."



CMI Model E centrifugal drier.



Buda 8-DAS-1125 supercharged diesel,



Caterpillar D397 engine.

200 hp, with GM torque converter; Model 6-110 6-cylinder engine in the 250-275-hp class; GM torque converter.

(178) Euclid Road Machinery Co., Euclid 17, Ohio—25-ton bottom-dump coal hauler equipped with 200-hp diesel engine developing loaded speed up to 32.8 mph; Model TD 22-ton rear-dump truck with spring-mounted drive axle for loaded speeds up to 32.4 mph.

(179) Harnischfeger Corp., Milwaukee, Wis.—Latest-type diesel engine, available in various models and horsepowers for multi-service applications.

(180) Hercules Motors Corp., Canton, Ohio—Hercules 4-cylinder high-speed diesel; gasoline and diesel power units; diesel replacement engines for hight trucks; flat diesel engines for mine locomotives.

(181) International Harvester Co., Chicago 1.—Model LFD-302 truck with 145-in-wheelbase chassis powered by NHB Cummins diesel; Model LF-212, 157-in-wheelbase chassis, RD-450 engrins.

(182) R. G. LeTourneau, Inc., Peoria, Ill.—Model A 50-ton Tournarocker—a rocker-dump haulage unit pulled by a Tournamatic Tournapull powered by either a butane or diesel engine and developing speeds up to 34.05 mph.

(183) Mack Mfg. Corp., New York 1—Model LVT tractor with Heil 40-ton bottom-dump trailer, equipped with Planidrive rear axle, 8-speed Duplex transmission, and 300-hp NHRBS Cummins diesel; Model LJT

highway-type tractor; Schneider torque converter; 8-apeed Mack transmission; Mack Power Divider.

(184) Murphy Diesel Co., Milwaukee 14, Wis.—Murphy diesel engines and generators.

(185) Sterling Motors Corp., Milwaukee 1, Wis.—Heavy-duty 161-in-wheelbase dump truck with 175-bp Cummins diesel engine and 10-cu yd body, featuring special high-traction differential and Sterling "Super-Traction" axle—a planetary-gear modification designed to reduce strains on axles and driving parts.

(186) Twin Disc Clutch Co., Racine, Wis., and Rockford, Ill.—New Model F direct-drive hydraulic torque converter for heavy-duty trucks; three-stage hydraulic torque converter; aluminum hydraulic couplings; Hydrosheave drives; friction clutches; and hydraulic power takeoff.

Preparation

(187) Allen-Sherman-Hoff Pump Co., Philadelphia 2—Hydroseal materials-handling pumps featuring the new A-AB-frame pumps with vertically split shell and rubber liner. Respective capacities, at 70-ft maximum head, are 25 to 150 and 75 to 300 gpm. One pump can be converted to the other by changing shell and liner.

(188) Allied Chemical & Dye Corp., Solvay Sales Div., New York 6— Solvay calcium chloride for allaying dust and preventing freezing of coal. (189) Allis-Chalmers Mfg. Co., General Machinery Div., Milwaukee 1, Wis.—A-C car shaker; solids-handling and rubber-lined slurry pumps; A-C coal screens, including a 6x16-ft double-deck Low-Head screen and a 5x12-ft double-deck Ripl-Flo unit equipped with new "Thermo-Deck" electrically heated screen surface designed to prevent blinding of wet materials.

(190) American Air Filter Co., Inc., Louisville 8, Ky.—Dust collectors and air filters, including Types N and W RotoClones with wet-type dust collectors.

(191) American Cyanamid Co., New York—Heavy-media coal preparation.

(192) Ashland Oil & Refining Co., Ashland, Ky.—Permatrent spray oils.

(193) Barber-Greene Co., Aurora, Ill.—Stocking, reclaiming and coalhandling equipment.

(194) American Steel & Wire Co., Cyclone Fence Div., Waukegan, Ill.— Metal conveying belts and products.

(195) Bird Machine Co., S. Walpole, Mass.—Latest-type Bird Polisher designed to provide maximum clarification of washery water and removal of extreme fines.

(196) Bixby-Zimmer Engineering Co., Galesburg, III.—Line of B-Z Round-Rod screens for all dewatering, sizing, conveying, centrifugal, electrical-vibrating and special applications, including B-Z crown-mounted screens in operation, featuring step-deck design for dewatering and sixing and use of heavy-duty feed cloth at the feed end.

(197) Brown-Fayro Ce., Johnstown, Pa.—Newly improved "Cold-Oil" spray system for high-pressure application of cold oil as a finely atomized spray fog designed to provide a thin film or coating that seals surfaces of the coal and also gathers dust particles into oil-bonded pellets.

(198) Cálcium Chloride Association, Washington 6—Calcium chloride for dustproofing and freezeproofing.

(199) Centrifugal & Mechanical Industries, Inc., St. Louis 18—C-M-I centrifugal driers, featuring the new Model E designed for economical cost,

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One-third the thickness of this page-that's the accuracy tolerance we insist on for wire that goes into the making of Wickwire Rope. Wire that doesn't meet this close tolerance is rejected. On finer sizes of Wickwire rope wire, tolerances are even closer, amounting to about one-sixth the thickness of this page.

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Wickwire Rope is available in all sizes and constructions, both regular lay and Wisscolay Preformed. See your nearest Wickwire distributor for the right rope for your particular needs. For your free copy of "Know Your Ropes," write to Wire Rope Sales Office, Wickwire Spencer Steel Division of C. F. & I., Palmer, Mass.

LOOK FOR THE YELLOW TRIANGLE ON THE REEL

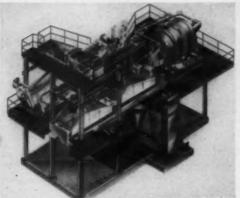
ICK WIRE

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

WIRE ROPE SALES OFFICE AND PLANT-Polmer, Mass. . EXECUTIVE OFFICE - 500 Fifth Avenue, New York 18, N. Y. SALES OFFICES -- Abilene (Tex.) * Boston * Buffolo * Casper * Chattanaoga * Chicago * Denver * Detroit * Emlenton (Pa.) * Houston Odessa (Tex.) * Philadelphia * Phoenix * Salt Lake City * Tulsa

PACIFIC COAST SUBSIDIARY-The California Wire Cloth Corporation, Oakland 6, California





Wemco Mobil-Mill with drum-type separator.



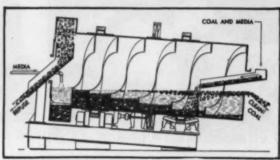
Allen-Sherman-Hoff A and AB pumps.



Wedge Wire Carp. Protected screen.



Kanawha-Belknap duplex angle-type washer,



R&S-Hardings countercurrent heavy-media separator.

low space requirements and maintenance. Measuring approximately 6x6x6 ft, Model E provides easy access to operating parts and maximum productive capacity of dried coal at a low cost per ton.

(200) Combustion Engineering Superheater, Inc., Flash Drying Div., Chicago—C-E Raymond flash-drying system, including a new application of the Raymond system as a pre-drier ahead of a dry-cleaning plant.

(201) Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div., New York—Wissco metal processing belts, Super-Tempered precision screens and perforated metals.

(202) Nelson L. Davis Co., Chicago—Heavy-media preparation, featuring the new two-stage processor coalcleaning plant permitting full control of the ash content of the cleaned coal while preventing the loss of combustible material in the reject, with special provisions for closing the cleaning circuit. The design permits recovery of the float coal at levels down to 1.35 ap gr and sink reject at levels up to 2.00, together with isolation of the intermediate product, which can be crushed and retreated. Also featured were packaged units of 50 to 325 tph, and custom-built washeries.

(203) Deister Concentrator Co., Ft. Wayne, Ind.—SuperDuty Diagonal-Deck coal-washing tables for fine-coal cleaning; Concenco revolving feed distributors; and Concenco spray nossles.

(204) Diester Machine Co., Ft. Wayne, Ind.—Plat-O coal-washing tables and Diester vibrating screens, including new scalping vibrator—one of a group with new unit-type head motions for easy installation and replacement. The vibrating mechanism is described as "life-time," as renewable bearings and shaft sleeves need only to be replaced to restore motion to new condition. Also featured was a new type of side tension to prevent whipping of the cloth in service.

(205) Denver Equipment Co., Denver 17—Flotation for the recovery of fine coal and reduction of ash, including use of slow-moving concentrate scraper for low moisture content.

(206) Differential Steel Car Co., Findlay, Ohio — Differential rock larries and other refuse-disposal equipment.

(207) Dings Magnetic Separator Co., Milwaukee 14, Wis.—New deep-burden rectangular suspended magnet utilising both mine power and battery power to provide power-failure protection, with ability to reach through bed of coal 24 in thick; Crockett magnetic separator for heavy-media processes; and Dings electro- and permanent-magnetic separators of various types for tramp-iron removal.

(208) Fairment Machinery Co., Fairment, W. Va.—Chance sand-flotation equipment and methods.

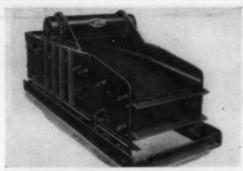
(209) Hendrick Mfg. Co., Carbondale, Pa.—Sixing, dewatering and testing screens: elevator buckets, chutes, ball-bearing frames; perforated metal of all kinds, centrifugal screens, drier screens, and pulverizer and crusher screens.

(210) Hewitt-Robins, Inc., New York

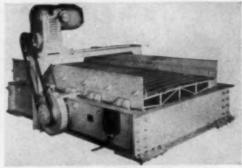
— Eliptex gear-driven waterisers;
Vibrex screen with new coll-spring mounting.

(211) Heyl & Patterson, Inc., Pittsburgh 22 — "Drying Dutchman" (Reineveld centrifugal Drier) developed in Holland and in use in Europe for 20 yr, now available from atock. Operating advantages featured include low degradation, higher overload capacity, greater recovery of fine sizes, lower maintenance costs and small space requirements. Also shown were standard 14-in H&P Cyclone thickeners for water clarification and recovery of fine sizes.

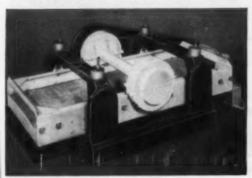
(212) Robert Holmes & Bros., Inc.,



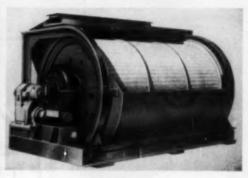
Deister Type UHS scalping screen.



Halmes Verti-Vibe serven.



Productive Equipment Gyrette screen.



Peterson TFR filter.

Danville, Ill.—Baughman "Verti-Vane" thermal-drying equipment, laboratory crushers and pulverizers, Holmes "Dust-O-Lator," screens, lowering spirals, tipples, etc., including the new Holmes "Verti-Vibe" screen. Features of the new screen cited by the company include: higher efficiency through controlled straight-line motion nearly vertical to the screen frame; greater capacity as a result of screening forces slightly off vertical and proper tilting of frame; no blinding or dead spots; longer cloth life; permanently fixed motions, eliminating adjustments; and low maintenance as a result of special construction.

(213) Humphreys Investment Co., Denver-Humphreys spiral coal cleaner.

(214) Jeffrey Mfg. Co., Columbus— Mechanical and electrical vibrating feeders; 30x36 heavy-duty double-roll crusher stated to be capable of breaking anything that comes from the face.

(215) Kanawha Mfg. Co., Charleston, W. Va., & Fuel Process Co., S. Charleston, W. Va.—New Belknap duplex washer that washes and treats coal with calcium chloride in one operation, with the wash box divisible into two or more sections to permit washing a wide range of coal sizes at different rates in the same washer; and new-type automatic specific-grant of the second control of the same washer; and new-type automatic specific-grant of the second control of t

vity control that maintains a constant specific gravity of washing solution and a uniform liquid level in the wash box.

(216) Link-Belt Ce., Chicago 9--L-B Multi-Louvre drier; L-B floatsink concentrator for heavy-media coal cleaning; floor-mounted CA doubledeck vibrating screen; and L-B oscillating conveyor featuring "PA" positive action and dynamic balance.

(217) Ludlow-Saylor Wire Co., St. Louis 10—Sta-Smooth even-surface screens; Sta-Tru Sta-Clear and Rex-Tang long-opening screens; special abrasion-resisting Super-Loy square-opening screens; woven-wire screens and cloth; and corrosion-resisting screens and cloth.

(218) Manu-Mine Research & Development Co., Reading, Pa. — Improved coal crusher with detachable plates for quick replacement.

(219) McLanahan & Stone Corp. Holidaysburg, Pa.—Crushers, including a 36x72-in Black Diamond single-roll crusher with a capacity of 1,500 tph and crushing R-O-M to 5 in; and an 18x18-in Bantam single-roll crusher.

(220) McNally Pittsburg Mfg. Corp., Pittsburg, Kan.—Coal washing, dense-media separation, centrifugal drying, heat drying and general preparation equipment, featuring Mc Nally-Tromp dense-media washer, Mc-Nally-Pulso coal drier, McNally-Norton Mogul wash box, McNally-Gearmatic breaker and McNally-Carpenter drier.

(221) Michigan & Southern Equipment Co., Columbus, Ohio—Bonded Scale & Machine units, including Model M1940 double-roll crusher; F75M reciporating plate feeder; and 238B double-deck vibrating screen.

(222) Pennsylvania Crusher Co., Philadelphia 7—Pennsylvania Bradford breakers, ring-hammer granulators and single-roll crushers.

(223) Peterson Filters & Engineering Co., Salt Lake City 1-Peterson disk filter and the new TFR (top-feedreservoir) rotary vacuum filter which can handle 1/8x0 products. It is available in eight standard sizes. The topfeed reservoir, according to the company, will not sand up when handling coarse, fast-settling products. Since there is a reservoir of feed, free-filtering material can be dewatered at maximum capacity. The drum can be loaded to the maximum, as in operating a conveyor from a feed bin. Surges are taken care of by a simple weir overflow on the reservoir. The major application is handling unclassified or heavy-gravity materials. There are no filter cloths. Stainless rod is used, permitting cake discharge while still un-

Equipment Bulletins Available for the Asking

(BI) A PROCHAM OF STORAGE RATTERY MAINTENANCE, knows as the "Pins-Performance Plan," has been originated by Gould-National Batteries, Inc., Trenton 7, N. J., to help industrial battery users get the maximum power and service life from their equipment. The plan is said to consist of a complete and integrated system of manuals, articles, specifications, bulletine, records and other material that explain how to choose, install, charge, maintain, inspect and test batteries. Special portfolios are prepared to give individual users the data particularly applicable to their needs and answers to additional specific questions also may be secured. A booklet describing the plan in detail available from the company includes a return card that simplifies requesting the exact information needed.

(B2) MOTOR PROTECTION—Coordinated interlinked protection of circuits, motors, and personnel is explained in a new 12-p high-voltage combination-starter booklet, DB-4678, available from Westinghouse Electric Corp., Pittsburgh 30. The booklet stresses the three-way (interlinked) protection for squirrel-cage, synchronous, sound-rotor, and multi-speed motor installations and illustrates three classes of combination motor starters, with details of features and selection of component parts.

(BJ) CUTTING MACHINES—Catalog 836, Jafrey Mfg. Co., Columbus 16, Okio, offers complete information on the design, features and applications of the Jeffrey line of universal and arewall cutting machines. The 28-p illustrated bookiet includes operating and specification data in the following units: Types 70-UR, 29-U, 28-UC, 28-L and 28-LC cutters, and boom-type drills for mounting.

(B4) VENTILATION TUBING—Features and applications of Flexipips for ventilating coal mines and tunnels are illustrated and described in detail in new 12-p booklet offered by Bernis Bro. Bag Co., St. Louis 20, Mo. The booklet includes mine maps showing recommended installations for various types of operations, with full data on installation and ordering.

(B5) CABLE YULCANIZERS—New 16-p Bulletin RV106 on the complete lime of Jay cable-jacket vulcanizers and supplies illustrates and describes the latest type of equipment for patching and repairing neopreme or rubber-covered electric cable and also contains helpful information on mode cable sizes, and vulcanizing precedures. Available from Dept. I-19, Joy Mfg. Co., Electrical Connector Div., Pittsburgh 32.

YES-I would like more information . . .

Please send me catalogs or further information about the items in the COAL SHOW REPORT numbered as follows: (June, 1951)

In addition,	please send i	ne data on	these OTHE	R products	advertised in
			index Amount (,)		

- USE THIS CONVENIENT CARD

... TO GET MORE INFORMATION on products mentioned in the COAL SHOW REPORT, to get Catalogs listed here or for data on any product advertised in this issue. Write in item numbers, tear out and mail.

(34) REAR-DUMP TRUCKS—Ruc-lid Road Machinery Co., Cleveland 17, offers a 16-p Folder 120 covering Models 31TD and 53TD rear-dump Euclide of 44,000-lb payload capacity. The catalog describes in detail many of the important parts and contains specification data on the complete units, which are equipped with a diesel engine of 286 or 300 hp and have speed ranges leaded of 3.1 to 22.4 mph.

(B7) DRILL AND CUTTER BITS— New 12-p Bulletin C-42 issued by the Joy Mfg. Co., Pittsburgh 22, covers the complete line of Sulmet tungstencarbide bits. It describes the 11 types of cutter bits, 8 styles of auger drill bits and 4 sizes of finger bits available, a new-type bit for drilling long blastholes with high-speed rotary drills, plus the complete line of augerdrill steel and couplings.

(BS) SINGLE-FEEDER SUBSTA-TIONS—Application, Jesign and performance of the CSP power transformer as a completely packaged, singlefeeder substation is described in a new 16-p Booklet B-4692 from the Westinghouse Electric Corp., Pittaburgh 30. The booklet emphasizes how combining the 48 components of a conventional substation into a single unit awas both time and money in planning, installing, maintaining and moving the equipment.

the; SLITHET Plinits — Complete design and operating details of its line of Hydroseal slurry, sand and dredge pumps in offered by Allea-Sherman-Hoff Co., Philadelphia 2, in its new 16-p Catalog 451. Detailed performance cables for the various types of units available, including the new AB Frame pump, are included, along with the necessary data for calculating the pump required for a specific application.

(B10) SPRED REDUCERS — New bulletins offered by Dodge Mfg. Co., Mishawaka, Ind., designed to simplify selection of a shaft-mounted speed reducer, are: Bulletin A-670 on Dedge double-reduction Torque-Arm speed reducer; and Bulletin A-602 on the single-reduction series of the Torque-Arm reducers. Comprehensive data in tabular form permits easy selection of the right reducer for any installation and speedy calculation of size of V-belts and sheaves required.

(BII) WIRE-BOPE BLOCKS AND SHEAVES—New 24-p Catalog 300-24 describes the complete line of the American Hoist & Derrick Co., St. Paul 1, Minn. In addition to detailed data on sixes, capacities and specifications, the book has a section on "How to figure line parts" that includes a ratio table and formula designed to make reeving and line-part figuring easy for riggers.

(B12) POWER SHOVEL—Catalog on the Bay City %-yd Series crawler-mounted unit, usable as shovel, crane, dragline, clamshell and hoe, discusses the heavy-duty design and construction of this convertible machine for excavating, creeting and material handling. Machinery assemblies, parts and attachments are described in de-

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EQUIPMENT BULLETINS AVAILABLE—Conf'd

tail and various applications are covered.

(B12) SOUND-FILM CATALOG rully describes the 72 sound films covering general interest subjects, product information, and training and instruction courses available from Westinghouse. All films are leaned free to organised groups, such as church, social, professional, civic and business, with oset of transportation paid by horrower. Catalog B-4761, available from Westinghouse Electric Corp., Pittaburgh 30, gives full information about each film, together with necessary order forms.

(B14) VALVES—New 44-p catalog describing its complete line of valves available from Ross Operating Valve Co., Detroit 3, Mich., covers hundreds of standard models and modifications of various types, with detailed descriptions, sectional views, installation data and diagrams, and general reference data.

(BIS) ROOF MAINTENANCE—Designed to assist in determining the exact condition of building roofs and planning repairs, new belletin illustrates virtually every type of roof damage, explains how and why roofs deteriorate and indicates trouble spots where the first danger signs appear. Methods of patching and leak-stopping, resunfacing and renewing old roofs are described. Builtsin 102-7 available from the Monroe Co., Inc., Clevelland 6.

(B18) MAINTENANCE AND CARE
OF CLAMSHELL BUCKETS is thoroughly covered in 42-p Bulletin 2373
published by Blaw-Knex Div., Blaw-Knex Co., Pittsburgh 22. Included are
suggestions on the proper use of clamshell buckets, with a list of common abuses to be avoided, and detailed in-

atructions for straightening distorted bucket lips, repairing fractures, hardsurfacing cutting edges and rebuilding worn cutting edges. "How to reeve the bucket for maximum efficionty," prolonging bucket cable life and replacement of compensat parts also are included.

(B17) CABLE TOOLS FOR DRILL-ING blastholes and borsholes, and for prospecting, are covered in a new 52-p estalog that illustrates and describes in detail the extensive line of equipment made by Sprang & Co., Butler, Pa. The booklet offers complete information on the construction, application and sizes of a wide range of drilling bits and auxiliary apparatus.

(B18) ELECTRIC MOTORS—Bulletin offers construction, operating and dimension data on the Wagner Types EP and JP polyphase squirrel-cape totally enclosed fan-cooled motors featuring cast-iron construction for extra protection against corrosiva. Available from the Wagner Electric Corp., St. Louis 14.

(B19) AIR CONDITIONING—Equipment for a wide range of air conditioning applications: cooling, heating, rehundifying, cleaning, filtering, circulating, ventilating, or air handling, in covered in a 16-p condensed Westinghouse Catalog SA-6692. The equipment listed has been carefully selected from the full line to save user's time. Westinghouse Electric Corp., Sturtsvant Div., Hyde Park, Boston 36, Mass.

(B36) ALUMINUM GRATINGS for industrial flooring, stair treads, walk-ways, etc., are discussed in a folder issued by the Irving Subway Grating Co., Inc., Long Island City 1, N. Y. The bulletin includes data on standard panel widths, weights and safe

loads for gratings available in various types and specings.

(B21) GEAR LUBRICANT — Now bulletin from the Swan-Finch Oil Corp., New York 20, graphically demconstrates the better performance and longer service obtained with its "highviscosity-index." Motal Super Gyrel Gear Oil SAE 90.

(BER) PROTECTIVE MAINTEN-ANCE OF DIESEL ENGINES is discussed in its service bulletin, "Protective Maintenance Increases Profits," available from Cummins Engine Co., Inc., Columbus, Ind. Among the subjects covered is an outline of when and how to start a program, and what it can mean in less down-time and more economical engine operation.

(Bas) ROLLER CHAINS AND SPROCKETS FROM STOCK—Catalog RS-50 remained by the Whitney Chain Co., Hautherd, Coan., provides complete specifications and engineering raference tables on American standard roller chains, specchets and attachments, and on allied products, such as, block chain, eable chain and ferrible couplings.

(B24) SPECIAL-PURPOSE LUBRI-CANT—Bookiet entitled "Holybdeaum Disulfide as a Lubricant" presents excerpts from various technical papers on this subject and includes detailed engineering data on properties and performante in specific applications. Available from Climax Molybdenum Co., New York.

(RMS) FILING SYSTEMS—Elimination of bulging and unaystematic files, fire protection, ready expansion and complete marshalling of facts within elbow reach are benefits of its Kardex system of filing, reports Remington Rand, Inc., New York 10, in offering a 24-p booklet, "Kardex Cabinet Equipment." The booklet describes the five types of cabinets available and application of the system.

(B26) WATER CLARIFICATION—Literature available from the Gale Oil Separator Co., Inc., New York 17, describes the application and operation of the Gale interceptor and separator systems, which are said to be particularly adaptable to remove oil, greese and acid liquids from industrial waste water.

(B27) SPECIAL-SIZE CASTINGS—Bulletin describes the specialized round-casting service offered by the Fyott Foundry & Machine Co., Chicago 7, and illustrates a number of typical castings made for applications as pulleys, flywheels, sheaves, gear blanks, etc.

(R38) PIPE TOOLS — "Operating Guide" issued by Beaver Pipe Tools, Inc., Warren, Ohio, is designed to help users of both portable pipe and bolt machines and hand pipe tools with fillustrated auggestions on tool operation and maintenance, and how to lecate and correct many troubles.



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it's ANACONDA BUTYL-INSULATED **High Voltage Cable**

No metal armor or lead sheath, yet . . .

There's even greater mechanical and electrical protection in the combination of neoprene jacket and butyl insulation.

Together they provide:

Unequalled protection from impact, crushing, twisting and abrasion.

Higher dielectric strength.

Greater resistance to moisture, acids, oils, ozone, heat and flame.

Less weight, more flexibility; easier to handle, install, splice and maintain. Lower first and final costs!

ANACONDA Butyl-Insulated High Voltage Cable is the modern cable for any mine-particularly mechanized mines. Anaconda also specializes in the manufacture of shuttle car cable and cable for the new continuous mining machines. Let our mine service specialists show you, or get in touch with your near-by Anaconda Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.



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ANACONDA

WIRE AND CABLE



Joy PAG4429 permissible Safety Circuit Center



Joy ground-fault detector cell.



Ensign-Clark Bulletin 6320 non-reversing starter.



Joy magnetically locked permissible splice box.

der vacuum, thus resulting in lower cake moisture. High-frequency vibration can be provided on the screen deck, further reducing cake moisture.

(224) Productive Equipment Corp... Chicago 12—Gyroset dewatering and sizing screens; and new Gyrette screen, a low-cost unit designed for high efficiency in dewatering and sizing, available in 2x6- and 3x6-ft sizes, with one, two or three decks for suspension or base mounting.

(225) Quaker Rubber Co., Philadelphia—Chute linings.

(226) Roberts & Schaefer Co., Chicago 6 - Hardinge counter-current heavy-media separator, successfully operated on the Iron Range since 1949 and newly available to the coal industry. Features include low power requirements, low quantity of medium needed to fill circuit, low ratio of medium to coal, minimum maintenance, handling of large pieces of coal with no increase in power or wear, and short start-up time, with separator starting under full load after power interruption. Units are available in seven sizes up to 10-ft diameter and feed rates of 500 tph. Also shown were two R&S Super-Airflow pneumatic coal cleaners, a 6x12-ft unit for cleaning minus %-in coal and a 6x4%ft unit for cleaning nut and pea; and R&S 6-ft Hydrotator to wet-wash nut, stoker or slack below 2-in top size.

(227) John A. Roebling's Sons Co., Trenton, N. J.—Woven-wire screens and cloth.

(228) Screen Equipment Co., Inc., Buffalo 25, N. Y. — Seco vibrating screens, including a Type HS 4x12-ft double-deck unit equipped with a ball-tray attachment to prevent blinding.

(229) Simplicity Engineering Co.,

Durand, Mich.—Simplicity horizontal and Simpli-Flow single-deck screens; Simplicity Os-A-Veyor feeders and conveyors.

(230) Stearns Magnetic Mfg. Co., Milwaukee 46 — Stearns magnetic equipment for tramp-iron removal and heavy-media recovery, featuring Type MW heavy-media separator, described as including special pantented pole construction providing a wide area of magnetic air gaps and uniform magnetic field over the eatire magnet. Magnet coils are protected against moisture damage by a waterproof copper cover.

(231) W. S. Tyler Co., Cleveland 14—Woven-wire screens and Tyler standard screen-scale testing sieves; Ty-Rock vibrating screen equipped with the newly developed Ty-Electric heating unit for heating screen surface to prevent blinding; and new quiet-operating Model V-52 Hum-mer electric vibrator also equipped with new Ty-Electric heater system.

(232) United Engineers & Constructors, Inc., Philadelphia—Chance sand - flotation and preparation engineering.

(233) Wedge Bar Screen Corp., Far Rockaway, N. Y.—Wedge Bar dewatering screens, including new types for high-speed sizing and dewatering vibrators.

(234) Wedge Wire Corp., Cleveland 2—Kleenslot wedge-wire for installation on vibrators without material changes, including screens (patent applied for) with guards for protection against the impact of heavy materials, and to increase dewatering ability.

(235) Western Machinery Co., San Francisco 7.—Wemco Mobil-Mill incorporating new Wemco drum separator; Wemco coal spiral; laboratoryand commercial-size Fagergren flotation machines; Wemco heavy-media coal-cleaning e q u i p m e n t; Wemco slurry pumps; and Western-Knapp ongineering service.

(236) Yara Engineering Corp., Interstate Equipment Div., Elizabeth 4, N. J.—Aerial tramways, including conveying-type units up to 400 tph and self-dumping fib-back units with 10-ton carriers.

Motors and Controls

(237) Allis-Chalmers Mfg. Co., General Machinery Div., Milwaukee 1, Wis.—A-C motors, including tube-cooled and totally enclosed fan-cooled units; motor starters and control equipment.

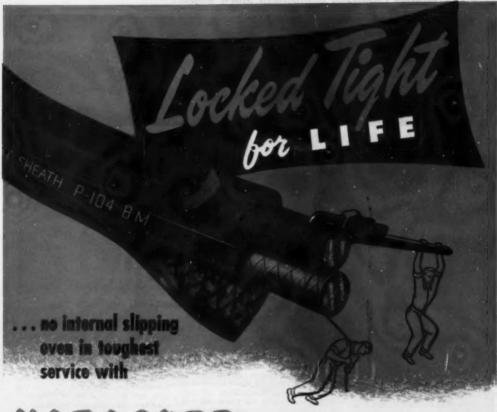
(238) American Mine Deer Co., Canton 6—Feeder boards for various types of mining machines.

(239) Albert & J. M. Anderson Mfg. Co., Boston 10—Pow-R-Gard and Ground-Gard entry-to-face power-distribution system.

(240) Deoley Bros., Peoria, Ill.—New Superior contactors originally built for Dooley units and now available for any type of electrically-powered machine. After current is turned on at rear of machine by a small well-protected button, it may be instantly shut off by the slightest pressure on any of three conveniently located cut-off buttons, with activation of rear starting button again necessary to resume machine operation. New Dooley switches available for coal drills may be operated as either standard on-off or deadman switches or are available separately for either type of operation.

(241) Electric Controller & Mfg. Co., Cleveland 4-"Tab-Weld" resistors for motor controllers; Valimitor starter for 2,300-4,600-v motors, new automatic reclosing sectionalizers for 230- and 550-v DC stub-end power circuits that test circuits for faults and overloads with a low-voltage "feeler" of less than 50 v intermittently applied and pulsating, thus eliminating hazards of fire and shock. The unit will reclose only when the load is low and safe. New contactor for AC motor starters that holds circuit closed on voltage dips with full spring pressure on the contacts down to the release point, thus preventing arcing and welding of contacts. Timing relay can be added for automatic restarting if voltage recovers in 2 sec or less

(242) Ensign Electric & Mfg. Co., Huntington, W. Va.—Ensign and Ensign-Clark magnetic starters and control equipment in open and explosiontested enclosures for both AC and DC, including: Ensign Bulletin 1125 safety belt control, Ensign Bulletin 1101 explosion - tested - enclosure centrifugal



HAZACORD

TWIN PARALLEL TRAILING CABLE



Experience has shown, as you have probably found yourself, that when a twin parallel trailing cable works loose inter-

parailet training cable works noise internally — its days are numbered. Hazard's new design prevents this costly trouble — as has been proved out in actual mining service. It's designed especially for shuttle car operation where cable is subject to high-speed reeling.

The tough, long-wearing, flame-resistant Hazaprene ZBF Sheath completely encases each insulated conductor—doubles the holding surface between insulated conductors and sheath, which are firmly bonded and interlocked to form one integral mass. And this extra wall of Hazaprene between conductors also prevents shorting, adds to the cable's flame-resistance. It's an excellent life-saving cushion, too, when cable is run over by equipment.

You'll find this Hazacord cable engineered throughout to give you longer, safer, more economical service than you ever had before from twin parallel trailing cable. The braid over the insulated conductors is made with a tough, reinforcing cord. Grounding conductor is highly dexible, compact and easy to splice. Over-all cable flexibility is ample for your highest-speed-reeling requirements. And the exceptionally abrasion resistant Hazaprene ZBF Sheath provides maximum flame-resistant qualities — more than meets the newest flame-test requirements of U.S. Bureau of Mines and Pennsylvania Department of Mines — "P-104 BM" is molded into sheath at frequent intervals.

For more information or a sample, see your Hazard representative or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

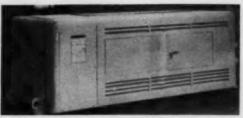
GAZABO

epitated where and realist for every mining was





Westinghouse underground switch house.



Westinghouse Mine Power Center.



Westinghouse selenium rectifier.



ECAM automatic-reclosing sectionalizer.



Ohio Bress Type BF-3 starter.

switch and Bulletin 1100 centrifugal switch; Ensign explosion-tested push-button stations; Ensign-Clark Bulletin 5390 three-step two-line enclosed starter with disconnect plug; Ensign-Clark Bulletin 5391 explosion-tested non-reversing starter; Ensign-Clark Bulletin 5395 across-the-line non-reversing starter; and new Ensign-Clark Bulletin 6340 explosion-tested magnetic-reversing starter for 15- to 75 hp, 440 and 220 v.

(243) Goodman Mfg. Co., Chicago— Camtactor controller; belt-conveyor roller switch.

(244) I-T-E Circuit Breaker Co., Philadelphia—KSC automatic -reclosing circuit breaker, BT-4 industrial thermostat relay, KB steel-enclosed circuit breaker, other breaker and control equipment.

(245) Joy Mfg. Co., Pittsburgh-Joy power-distribution systems and equipment, including F3961-1 suitcasetype Safety Circuit Center, PAG4429 low-height Safety Circuit Center, new strip-mine Safety Circuit Center for use on low-voltage secondary circuits, and new core-balanced ground-fault detector. The detector is used with an automatic circuit breaker and ISC intrinsic safety circuit, and provides 7.5amp ground-fault tripping through continuous-cross-section ground wire. Convenient push-button testing is provided and the unit is designed for wires up to 500,000 cir. mil.

(246) National Mine Service Co., Beckley, W. Va.—NMS-45 and NMS-68 controllers.

(247) Ohio Brass Co., Mansfield, Ohio-Types LG, KG and M distribu-

tion boxes: and new line of O-B automatic motor starters as follows: Type AF designed particularly for use with pumps but also applicable to hoists, conveyors, compressors and other units where a reversing switch is not needed and available for remote control or float-switch operation; Type BF specifically designed for conveyors but suited to positive control of other motor-driven units with protection against short circuits and overloads, and easily connected for interlocking sequence control of conveyors; Type BFG gas-proof unit primarily used for conveyor control in gaseous areas but also suitable for fans or pumps, etc.may be connected for remote control or float-switch operation; and Types BF-3 and BF-4 primarily designed for service with belt-conveyor motors from 10 to 25 hp and 30 to 75 hp, respectively. All units will start smoothly and evenly regardless of load or voltage conditions and restart motors automatically when power is restored after an interruption except when caused by a short circuit in the motor, in which case the overload relay must first be reset.

(248) Post-Glover Electric Co., Cincinnati 2.—P-G resistors and transfer switches, including the new Type M mercury switch for locomotive headights featuring compact sturdy construction and contacts gas-filled under pressure to minimize arcing and virtually eliminate the heat and corrosion found with ordinary air contacts; new magnetic contactor for a reel motor on a mine locomotive particularly designed to keep arcing away from the operator's hand; and Type S2 grid featuring a compact design

that makes it particularly applicable on mining units where space is limited.

(249) Reliance Electric & Engineering Co., Cleveland 10—AC and DC motors, gearmotors and V*S drives for adjustable speed control, including Reliance precision-built AC motors with Reli-X insulation, prelubricated bearings and motor-lead indexing.

(250) Schroeder Bres., Pittsburgh 1

—New conveyor-control switch for use on permissible assemblies. It is available in open or explosion-tested types, and is described as pilot-circuit device quickly operated from either direction by a tug on the actuating cord. One "on" and two "off" positions are provided, with the second "off" position providing an additional safety factor. For belt conveyors, according to the company, the switch provides complete control all along its length, including stop protection for rock falls. For chain and shaker conveyors, it provides "start-stop" control from the loading end without running an electrical circuit to that point.

(251) Westinghouse Electric Corp., Pittsburgh 30—AC and DC motors and controls in both permissible and non-permissible typea, De-Ion circuit breakers; locomotive headlights, floodlights and other lighting, and three new portable equipments for the distribution and utilization of AC power underground, each skid-mounted and designed for maximum portability. Each also has an overall maximum height of 42 in and is equipped with incoming and outgoing plug-type power receptacles for quick connection and ground-fault protective equipment.

The units are: portable underground



Moisture Absorption

In one of the seven "torture" tests given to this cable, a sample of Royal jacket (0.100 inch thickness) is first weighed, then immersed in distilled



mersed in distilled water at 70 degrees C for seven days. It is then removed and weighed and the amount of water absorbed is calculated, U.S. Royal Mining Machine Cable's jacket absorption is never more than 60 milligrams per sq. in.

7 reasons why U.S. Royal Cables mean safety:

Seven gruelling laboratory tests, each of them tougher than actual conditions, guarantee U. S. Royal's resistance to moisture, abrasion, cutting, heat, cold, impact, flexing. United States Rubber engineers spare no effort in making sure U. S. Royal is a completely safe electrical cable. Write Electrical Wire and Cable Department, United States Rubber Company, Rockefeller Center, New York 20, N. Y.



Approved by the Pennsylvania Department of Mines



U. S. ROYAL MINING MACHINE AND LOCOMOTIVE CABLES

COAL AGE . June, 1951

145



Elreca trolley slider.



Ohio Brass Form-H trolley tap.



Ohio Brass Form-J fused tap.



Mining Machine Parts trolley nip.

switchouse, designed for use in AC distribution systems where several feeders are required for several parts of the mine-protects each feeder, isolating trouble on each feeder so that it does not affect balance of system and automatically disconnecting feeder when overcurrent, line-to-line short-circuit faults, or line-to-ground faults occur; explosionproof 300-kva Mine Power Center-basically a drytype air-cooled transformer unit with related circuit-breaker equipment that normally receives high-voltage AC power from underground switchgear or direct from the surface and converts it to low-voltage AC for AC machines. Four outgoing circuit breakers normally supplied provide ground fault, short-circuit and overload protection to their circuits; Mine Type 250-V DC selenium rectifier especi ally designed for converting AC to DC for shuttle cars and other installations where small blocks of DC are required. It is offered in two ratings: the line-type where 220-240-v AC is fed direct to the selenium-stack assembly; and the "transformer" type, which has a built-in transformer cor nected between the AC supply and the selenium stack for use with voltages other than 240 v. Minimum maintenance is required since the plate-type units have no moving parts, and the rectifier stacks are "Fosterite"-coated. a Westinghouse process that provides protection against moisture and corrosion The unit is fan-cooled, with interchangeable air filters at the inlet and.

Electrical Wire, Cable and Specialties

(252) American Steel & Wire Co., Cleveland — USS Amerciad mining cables, feeders, trolley wire and bonds.

(253) Anaconda Wire & Cable Co., New York 4-New flexible-strand shuttle-car cable with cold-rubber insulation for higher efficiency and longer life; new parallel lightweight cable for continuous mining machines providing equal service with a considerable reduction in size and weight.

(254) Electric Storage Battery Co.,

Philadelphia-Exide-Ironclad storage batteries for a wide range of mining applications, featuring a newly developed vinyl-plastic paint for battery trays that resists corrosion and cracking by shock.

(255) Electrical Distributors Co., Philadelphia 7-Johnson faultfinder and proof tester. In operation, a bank of capacitors is charged to any potential between 1,000 and 15,000 v DC by a rectifier and transformer, and then discharged into the cable. This creates an arc with a loud report at the fault. The unit can be used with single- or multiple-conductor cable, not only for faultfinding but also for testing after

(256) Elrece Corp., Cincinnati-Elreco section insulators, switches, expansion bolts, hangers, clamps and fittings, and new Elreco inverted trolley system, fused trolley tap, J-hook, 1,500,000-cir mil combination feeder and trolley clamp, and new Elreco

The new fused tap, the company states, holds the cable twice to reduce pullouts to a minimum, employs a split-bolt terminal to make connection easy without bending or separating strands, prevents cable damage by bellmouthed strain bushing, and uses either conventional or threaded fuses. The neoprene thumb and hand guard protects the operators, with no chance of the jam nuts being welded into position. The tap is available in singleand double-end models with a variety of contacts. The new J-hook is designed for attachment to timber or rib with a single spike, and is made of steel strip insulated with bonded neoprene and rubber. It can be used for hanging either bare or insulated stranded conductors, and is insulated to 10,000 v.

Features of the new harp include slider support at contact level, with the slider pivoting on the harp at wirecontact level, ample bearing surfaces machined to lengthen life, simplified construction for easy replacement, self-aligning spring, reversible clamp (% to % in), and heavy superflexible shunt.

(257) Ensign Electric & Mfg. Co., Huntington, W. Va.—Ensign low-re-sistance rail bonds, Ensign cable rack,

Ensign lever-action line connectors Ensign dusttight shuttle-car distribution box, Ensign permissible distribution box with safety lever-action plugs, Ensign Single "G" permissible distribution box, other distribution and control equipment.

(258) Erico Producta, Inc., Cloveland-New Cadwell process for bonding copper to steel with powdered-metal alloys for welding all types of mining cables

(259) Flood City Brass & Electric Ca., Johnstown, Pa.—Trolley-line materials and fused switches.

(260) Gould National Batteries, Inc., Trenton 7, N. J .- Gould storage batteries for mining, with detailed data on the new Gould "Plus-Performance Plan" available to users to help conserve and extend battery service (see insert opposite p 140).

(261) R. M. Hollingshead Corp., Cocoon Engineering Div., Camden 2, N. J.—Cocoon sealing of cable splices.

(262) Joy Mfg. Co., Pittsburgh. Pa. Straight-pin Bigun cable connec tors, oval push-pull electrical plugs, steam- and direct-heat cable vulcanizers for all sizes of cable, and the new Bureau of Mines-approved splice box including the following features: neoprene construction integrally molded to cable, AC or DC service, sealed against water and dirt, and locked with a tamperproof magnetic lock.

(263) Mosebach Electric & Supply Co., Pittsburgh 3, Pa.—Overhead line material and other electrical specialties, including rail bonds, feeder switches, cable snubber and clamptype trolley taps.

(264) Mining Machine Parts, Inc., Cleveland-New MMP-Jabco line of ground clamps and trolley taps featuring line instead of point contact to prevent excessive wire pitting.

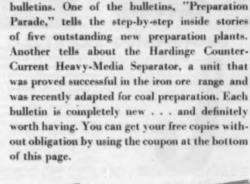
(265) Ohio Brass Co., Mansfield. Ohio-O-B "High-Mileage" trolley and feeder material, rail bonds and locomotive current collectors, featuring a new line of Form-H and Form-J fused taps for protection of trailing cables from short circuits together with their six types of contacts and two terminals. Form-H taps are used at the ends of cables, with any of the

FREE TO COAL EXECUTIVES THESE FOUR NEW INFORMATIVE BULLETINS



BULLETIN No. 174

Title, "Preparation Parade." Twelve pages in color; gives complete operating data on five well engineered, well run coal preparation plants. A section in the back of the bulletin summarises latest preparation equipment. Truly a parade of modern coal preparation plants and equipment.



You will find page after page of valuable coal preparation news and data in these four new



BULLETIN No. 175

Subject: Air Washing Coal. Eight pages in color; gives complete information on the Roberts and Schaefer Company Super-Airflow coal cleaning units. Drawings and specifications of various size units, typical flow sheet and other useful information also included.



BULLETIN No. 176

Subject: Wet Washing Coal. Eight pages in color; shows complete line of Roberts and Schaefer Company wet washing equipment. This is the first time that all R&S wet washing equipment has been described in detail in a single bulletin.



BULLETIN No. 177

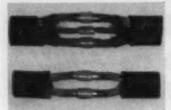
Subject: Counter-Current Heavy-Media Separation. Four pages in color; explains principles and operation of the Hardinge Counter-Current Heavy-Media Separator, a separatory vessel that Roberts and Schaefer is introducing to the bituminous coal industry after its success in the iron ore range.

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Erice welded cable splice.



Anaconda shuttle-car cable.



Mining Machine Parts ground clamp.



Elrece trolley top.



C

Elreco J-hook.

six contacts designed for varying service screwed into their top terminals. Form-J double cable-end taps may be used at any point in the cable or in a cable connecting a current collector and a locomotive motor, with the trailing cable connected to the power by a rubber handle equipped for the various types of contacts. The two cable-holding terminals are designed for high strength and will fit regular or stud fuses.

(266) Okonite Co., Hazard Insulated Wire Works Div., Wilkes-Barre, Pa.—Large twin 4/0, Type G heavy-duty cable with insulation bonded to sheath and neoprene walls between ground and conductors; other mining wires and cables.

(267) Penn Machine Co., Johnstown, Pa.—Super-Weld rail bonds, including Everlast reversible bond and wedge bond.

(268) John A. Roebling's Sons Co., Trenton, N. J.—Roebling electrical wires and cables.

(269) Rome Cable Corp., Rome, N. Y.—Complete line of Rome cables approved for mining applications.

(270) Simplex Wire & Cable Co., Cambridge 39, Mass.—Insulated wires and cables in all sizes for all types of mining service.

(271) Standard Devices Co., Cleveland 3—Renewable fuses of the timelag variety, complete line of trolleytap fuses, complete line of Standard fused trolley taps featuring special clamping facilities for relieving strain and capacities up to 400 amp; Standard fused cable protectors in capacities up to 400 amp at 600 v; Standard Jr trolley taps in capacities up to 30 amp at 600 v.

(272) Schroeder Bros., Pittsburgh 1. Pa.—New W. I. waterproof-insulation cable-splicing tape, featuring complete bonding without pressure.

(273) U. S. Rubber Co., Electrical Wire & Cable Dept., New York 20—U. S. Royal portable cord and cables for mining machines, locomotive, telephone, borehole, shotfiring, shovel and dredge applications, 'ncluding the newly developed Laytex-insulated mining cable offering superior electrical and physical characteristics, light weight and smaller diameters through unusual bonding characteristics of the Laytex insulation; plus new Uscolite splice housing designed to replace the laborious and costly hand-taping of splices and available for two, three- and four-way splices.

(274) Westinghouse Electric Corp., Pittsburgh 30—Westinghouse line of trolley-line and feeder material.

Power Transmission

(275) Aeroquip Corp., Jackson, Mich.—Aeroquip flexible hose lines equipped with Aeroquip detachable and reusable fittings; Aeroquip self-sealing coupling.

(276) Allis-Chalmers Mfg. Co., General Machinery Div., Milwaukee 1, Wis.—Texrope drives and new Automatic Vari-Pitch sheave permitting changes in motor speed while drive is in motion.

(277) Cleveland Worm & Gear Co., Cleveland 4—Speed-reduction units for mining equipment.

(278) Dodge Mfg. Corp., Mishawaka, Ind.—New Torque-Arm reducers, Taper-Lock steel conveyor pulleys, and Dodge power-transmission equipment, including couplings and takeups.

(279) Link-Belt Co., Chicago 9— Hydraulically operated P.I.V. variable speed drives.

(280) Pittsburgh Gear Co., Pittsburgh 22—Tapered-serrated shafts and pinions, armored gears and other parts for heavy-duty service.

(281) Raybestos-Manhattan Co., Manhattan Rubber Div., Passaic, N. J. —Transmission belts, V-belts.

(282) U. S. Rubber Co., Mechanical Goods Div., New York 20-V-belts for motor drives.

(283) Westinghouse Electric Corp., Pittsburgh 30—Westinghouse Gearmotors, new-type speed reducers and locomotive gears.

Bearings

(284) Ahlberg Bearing Co., Chicago
—Ahlberg X-change bearings; full
line of precision ball bearings and
mounted units.

(285) Bearing Service Co., Pittsburgh 13—Complete line of bearings for all types of mining equipment.

(286) Dodge Mfg. Corp., Mishawaka, Ind.—Dodge-Timken bearings.

(287) SKF Industries, Inc., Philadelphia 32—SKF ball and roller bearings and pillow blocks.

Wire Rope and Steel Products

(288) Alan Wood Steel Co., Conshohocken, Pa.—A. W. Algrip abrasive rolled-steel floor plate.

(289) American Chain & Cable Co., American Cable Div.—Bridgeport 2, Conn.—6x36 Seale mining-machine ropes, wire-rope slings, Tru-Lay and Lay-Set preformed rope, other mining ropes.

(290) American Steel & Wire Co., Cleveland—Tiger wire rope, slings and fittings.

(291) American Steel & Wire Co., Cyclone Fence Div., Waukegan, Ill.— USS Cyclone fencing.

(292) Armco Drainage & Metal Products, Middletown, Ohio—Steelox buildings, steel sheeting, bin-type retaining walls, Flex-Beam guard rail.

(293) Bethlehem Steel Co., Bethlehem, Pa.—Wire rope and fittings for underground and surface application.

(294) Broderick & Bascom Rope Co., St. Louis 15—Wire rope, braided safety slings, and twin thimbles for continuous reeving of slings.

(295) Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div., New York 22—Line of 26 standard wire ropes and fittings.



JOY Price Sheet 5212-2.1



JOY Price Sheet 5212-2



JOY Price Sheet 5211-2 & 3



JOY Price Sheet 5211-4

One-piece, factory molded assembly strengthens cable connector junction

- Tough, molded-as-a-unit Neoprene Jacket. resists wear and increases safety
- Expert Pin and Socket design (see below) insures low-contact resistance
- Neoprene faces fit closely when engaged, insuring a water-sealed connection

PUSH-PULL STYLE

ELECTRICAL CONNECTORS

Your confidence in JOY Electrical Plugs or Receptacles is always justified. Job-proven on thousands of installations under every conceivable working condition during the past quarter-century, they're unequalled for performance, safety and durability. One-piece-molded-to-cable design (details at left) makes them water-tight, shatter-proof and amazingly age resistant... and because they're made of Neoprene, oils, acids, alkalies or moisture have little effect on their life span or conducting efficiency.

Available in a wide variety of conductor numbers and sizes, they are ideal for connecting electrical power to all kinds of portable machinery or semistationary equipment subject to periodic relocation.

Remember—JOY job-proven Plugs and Receptacles actually cost less because they last longer. Ask for full details with descriptive literature today.

CHOICE OF 4 JOB-PROVEN STYLES

PUSH-LOCK . . . Slight twist during engagement locks connectors and prevents accidental disconnects. Available in 32 volt rating for weld-ing needs. Also supplied in 600 and 5000 volt designs.

STANDARD ROUND . . . A favorite of many years standing. Single Conductor designs available for 600 or 5000 volts . . . multiple designs rated at 600 volts. multiple conductor STANDARD OVAL . . . Best for general all-around use. Available in polarized three and four or nonpolarized three conductor designs rated for operation at 600 volts or less.

SHROUDED OVAL . . . Extended skirt or shroud on male plug guards contact pins. Available in polarized three and four conductor designs rated for operation at 600 volts or less.

WIDE SELECTION OF MATING RECEPTACLES



Provide a long life of snug low-resistant contact. Spring-loading causes I.D. of socket to match O.D. of its mating male pin during engagement. Unique design prevents bell-mouthing or over-expansion.

SOLID MALE CONTACT PINS



JOY Male Connector Pins have no split ends to collect dust or increase resistance. They are accurately machined as solid units from high quality rod, carefully selected for its low resist-ance and wearing qualities.



There's a JOY Receptacle or Gang (multiple outlet box) for nearly every standard electrical need. All have one-piece replaceable Neoprene inserts manufactured to the same exacting specifications set up for JOY Portable Plugs (see description above and at left). Many are available in choice of terminal back or pig-tail lead designs. UNIT ILLUSTRATED is Joy's No. 532MM, curved base three conductor Machine Receptacle. Machine Receptacle.

CABLE VULCANIZERS



Consult a Goy Engineer

WAD MESAGE

GENERAL OFFICES: HENRY W. OLIVER BUILDING PITTSBURGH 22.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO



Trabon automatic lubricating system.

(296) Columbia Steel Co., San Francisco, Calif.—Steel products for the

(297) Hendrick Mfg. Co., Carbondale, Pa.—Mitco grating and all types of perforated metal.

(298) Jones & Laughlin Steel Corp., Pittsburgh 30, Pa.—Wire rope and steel products, including Jalloy steel for abrasion and impact resistance, especially in chutes and truck bottoms; Otiscoloy high-strength alloy steel for mine cars, truck bodies, etc.

(299) A. Leschen & Sons Rope Co., St. Louis 12—Hercules Red-Strand preformed and other wire rope, slings and fitth ga, including a new-type flatlaced sling offering greater flexibility.

(300) Macwhyte Ce., Kenosha, Wis.

—Wire rope and slings of all kinds, including Atlas braided-body sling and new Safe-Gard Type 1 single-part sling developing full strength of rope by swaged sleeves.

(301) Oliver Iron & Steel Co., Pittsburgh 3—Industrial fasteners—machine, carriage, lag and special bolts; nuts, rivets, track bolts, tie rods, cap screws, U-bolts and eyebolts.

(302) Pattin Mfg. Co., Mariette, Ohio-Pressure tanks and special fabrications.

(303) H. H. Robertson Co., Pittsturgh 22—Galbestos roofing and siding; industrial ventilators.

(304) John A. Roebling's Sons Co., Trenton, N. J.—Complete line of wire rope and cables.

(305) Security Locknut Corp., Chicago 39-Security locknuts.

(306) Tennessee Coal, Iron & R.R.

Co., Birmingham, Ala.—USS Tennessee special tool and drill steel.

(307) Union Wire Rope Corp., Kansac City 3, Mo.—Tuffy wire rope and slings for mining, including new-type Tuffy scraper rope especially designed for the heavy-duty requirements of wheel scrapers.

(308) United States Steel Ca., Pittsburgh 30—Stainless and alloy steels for a wide range of mining equipment and applications, including Cor-Ten and Man-Ten.

(309) United States Steel Supply Co., Chicago—U. S. Steel products for mining applications.

(310) Upson-Walton Co., Cleveland 13—Upson-Walton wire rope and fittings and tackle blocks.

Lubrication

(311) Ashland Oil & Refining Co., Ashland, Ky.—Mining and industrial lubricants.

(312) Cities Service Oil Co., New York 5—Mining lubricants; specialty products, including rust-preventives and removers, solvents and core oils; Heat-Prover for checking furnace efficiency.

(313) D-A Lubricant Co., Indianapolis 23—D-A line of heavy-duty motor and diesel oils and lubricants.

(314) Farval Corp., Cleveland 4, Ohio—Farval centralized lubrication systems, including the recently developed Farval spray valve for lubricating open gearing and slide surfaces.

(315) Gulf Oil Corp., Pittsburgh— Mining lubricants, including Mining-Machine Lubricant B; Gulf mine-car grease; new-type cam grease for shaker screens designed to provide full protection of eccentrics and cams without leakage, separating, appreciable oxidation or loss of effectiveness under wet conditions; new Gulf motor flush for cleaning internal parts of gasoline engines without dismantling; and newtype Gulf No-Rust No. 6 for improved protection of metal surfaces.

(316) Lincoln Engineering Co., St. Louis, Mo.—Automatic, semi-automatic and manually-operated centralized lubricating systems, including the Centroller centralized system designed to replace oil cans, and the new Hydra-Luber system for use on all types of mining machinery, including loading machines; also heavy-duty power-operated drum pumps, bucket pumps, grease guns, fittings and accessories.

The new Hydra-Luber system, the company reports, utilizes the hydraulic system provided on the machines for the various motions. Each bearing is connected to a lubricant injector by rigid or flexible tubing. Injectors are adjustable externally to inject the exact quantity of oil or grease required by each bearing. The circuit of injector manifolds is connected by flexible hose to the main supply line terminating at the Hydra-Luber pump. The Hydra-Luber, supplied with lubri-

cant from an independent reservoir, is connected by flexible tubing to the hydraulic valve controlling machine movements (Coul Age, May, 1951).

(317) Pure Oil Co., Chicago—New Purceo in six weights, a general-purpose oil featured as a hydraulic oil and also used for ring oil, bearings and gear cases; new HT Grease B general-purpose lubricant for anti-friction and friction bearings, featuring water-resistance, high-temperature and low-pumpability characteristics.

(318) Shell Oil Co., New York 20— New Shell Alvania multi-purpose grease said to replace from 10 to 20 special-purpose greases and featuring high mechanical and temperature stability, good pumpability, resistance to water and good oxidation stability.

(319) Socony-Vacuum Oil Co., Inc., New York—Oils and greases, with emphasis on correct methods of lubricating mining equipment.

(320) Standard Oil Co., (Indiana), Chicago—Oils and greases for mining, including improved Stanoil line of general-purpose industrial oils for motors, compressors and hydraulic applications, available in 15 grades.

(321) Standard Oil Co. of Ohio, Cleveland—Sohio line of motor and diesel oils and greases for mining apnications.

(396) Stewart-Warner Corp., Alemite Division, Chicago 14—Lubricanthandling equipment. New Accumeter system available in three models: Model 0 for liquid oil; Model 1 for single-line systems using oil or grease; Model 2 for oil or grease in heavy-duty systems, such as tipples. Fully enclosed and easy to maintain, the Accumeter provides uniform feed regardless of lubricant weight, the company reports. Lubrication intervals may be controlled automatically or manually, with signals indicating system failure when on automatic.

(322) Texas Co., New York 17— Texaco "job-engineered" lubricants.

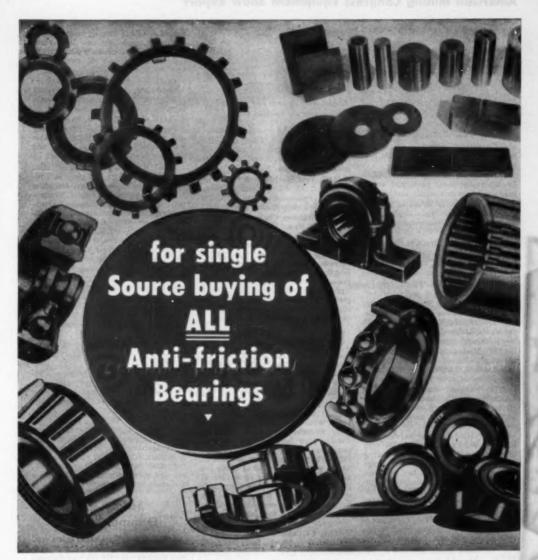
(323) Tide Water Associated Oil Co., New York—Tycol lubricants "engineered to the job."

(324) Trabon Engineering Corp., Cleveland 3—Automatic and manual lubricating systems for tipples, cleaning plants and other installations; new fully-automatic lubricating system for loaders, shuttle cars and other mining equipment powered from the hydraulic systems. The latter includes a Hydra-Lube pump connected to the supply line of any double-acting cylinder. Each stroke of the cylinder cycles the pump once. The volume per stroke is adjustable from a maximum of 0.25 cu in to almost zero.

Renewal Parts

(325) Clarkson Mfg. Co., Nashville, Ill.—Clarkson Uni-Flights and Uni-Flight conveyor chains.

(326) Complete - Reading Electric Co., Inc., Chicago 6 — Replacement



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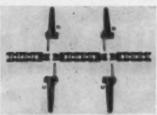
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Whitney universal-joint loader chain.

parts for motors and controllers; motor-winding supplies.

(327) Dooley Bros., Peoria, Ill.— Dooley replacement parts and armature exchange and repair service.

(328) Flood City Brass & Electric Co., Johnstown, Pa.—Replacement parts for mining machines and locomotives.

(329) Goodman Mfg. Co., Chicago-Genuine Goodman supply parts.

(330) Jeffrey Mfg. Co., Columbus-Accessories and replacement parts.

(331) Joy Mfg. Co., Pittsburgh, Pa. —Engineered parts.

(332) Kensington Steel Co., Chicago 28—Oro Kenkrome (alloyed manganess steel) chains and renewable-tooth sprockets designed for rapid replacement for coal preparation plants.

(333) Mining Machine Parts, Inc., Cleveland—Repair parts for mining equipment, including new "Loadmaster" universal conveyor chains.

(334) National Electric Coil Co., Columbus 16—Replacement coils for all types of rotating dynamos up to 50,000 hp; motor and generator service and insulating materials.

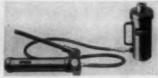
(335) National Mine Service Co., Beckley, W. Va.—Bemeco cable reel, intermediate gear with ball-bearing mounting, brush holders, swivel-type cable guides with sealed ball bearings, and other products, including "Locolite" sealed-beam headlights and other replacement parts for all types of mining equipment.

(336) Ohio Carbon Co., Cleveland— Carbon products, emphasizing carbon and copper-graphite brushes for all types of mining motors and gener-

(337) Penn Machine Co., Johnstown, Pa.—Replacement parts, particularly for loaders, cutters and locomotives, including helical, bevel and spur gears and pinions, splined shafts, worms and worm gears, solid-axle gears, and continuous axle liners.

(338) Reliance Electric & Engineering Co., Cleveland 10—Renewal parts for Reliance AC and DC motors to facilitate organized maintenance programs.

(339) Schroeder Bros., Pittsburgh 1, Pa.—Headlights for heavy-duty service on mine equipment featuring 6- or 32-v sealed beam bright at 500 ft, caststeel housing, steelclad resistors, everbright reflector, short heavy filament,



Simplex remotely controlled "Re-Mo-Trol" jack and hydraulic pump.

recessed bulb, and no adjustments.

(340) Bertrand P. Tracy Co., Pittsburgh—Repair parts for cutting machines and locomotives; locomotive gears and pinions.

(341) Tool Steel Gear & Pinion Co., Cincinnati 16—"Tool Steel" mine-car wheels; replacement parts for underground and strip-mining equipment.

(342) Whitney Chain Co., Hartford 2, Conn.—New Whitney universaljoint mine-loader chain designed for
ease and rapidity of installation to
minimize machine downtime. Flights
serve as connecting links to standard
lengths of chain and are quickly installed by inserting only two bolts and
tightening the nuts. Packaged as complete units, the chain sections readily
replace sections on the machine, which
can then be repaired in the abop.

Maintenance

(343) American Brake Shoe Co., American Manganese Steel Div., New York—Complete line of welding rods.

(344) Armstrong-Bray & Co., Chicago 30—Steelgrip rigid-arm and Chaingrip universal wheel pullers.

(345) Blackhawk Mfg. Ce., Milwaukee 1, Wis.—Hydraulic jacks up to 100 tons; wrenches and hand tools; hydraulic pipe benders and knockout punches; remotely controlled S-80 Porto-Power 50-ton hydraulic jack for varied service; new line of seven tension-indicator-wrenches up to 1,000 ft-lb; and two new models of hydraulic knockout punches for electrical conduit supplied as complete packaged units except for hose and hydraulic chamber.

(346) Carboloy Co., Inc., Detroit 32
—Carboloy 6-, 10- and 14-in tool grinders.

(347) Chicago Pneumatic Tool Co., New York 17.—CP impact wrenches, portable electric saws and other maintenance tools.

(348) Coffing Hoist Co., Danville, Ill.—Portable hoists, electric hoists, Ibeam trolleys, load binders and pullers.

(349) Complete - Reading Electric Co., Chicago 6—Test meters and motor-winding tools.

(350) Dodge Mfg. Corp., Mishawaka, Ind.—Dodge Slide-Set vise.

(351) Duff-Norton Mfg. Co., Pittsburgh 30—Screw, ratchet and hydraulic jacks in 5- to 50-ton ratings; rerailing jacks for locomotives and mine cars; loading- and cutting-machine jacks; mill jacks and pinion pullers. (352) Harnischfeger Corp., Milwaukee, Wis.—P&H welding machines and electrodes, including new low-hydrogen electrode particularly adaptable to difficult field repair of construction and shovel equipment.

(353) Joy Mfg. Co., Pittsburgh— Maintenance equipment, including bearing puller for outboard idler bearings.

(354) Manco Mfg. Co., Bradley, Ill.

-Portable hydraulic Guillotine cutting and riveting tools, including portable rivet squeezer for cutter bars, and portable wire-rope and wire cutter.

(355) Martindale Electric Co., Cleveland 7—Motor and generator repair and maintenance line, including mice undercutters and saws, commutator grinders, "Commstones," armature-repair tools, armature-testing instruments, electrical testing instruments, metal-marking equipment, portable electric blowers, flexible-shaft grinding machines, circular metal-cutting saws, and rotary burrs and files.

(356) Rust-Oleum Corp., Evanston, Ill.—Rust-preventive paints that prevent and stop metal rust, with rust on surface merging with the material to become a part of the elastic protective film; available in aluminum, white and all colors and applied by brush, spray or dip.

(357) Star Jack Co., River Grove, Ill.—Star ½- to 20-ton hydraulic jacks.

(358) Templeton, Kenly & Co., Chicago 44, Ill.—New remotely controlled hydraulic pump and ram units; Simplex Jenny center-hole hydraulic pullers with built-in pump units in models up to 100 tons capacity.

(359) Van Cleef Broa, Inc., Chicago 19—Dutch Brand friction and masking tape, including new "Plastix" designed to replace friction and rubber tape in electrical work and said to be acid-, oil- and grease-resistant, with a 7-mil thickness resisting 8,000 v.

Safety and Communication

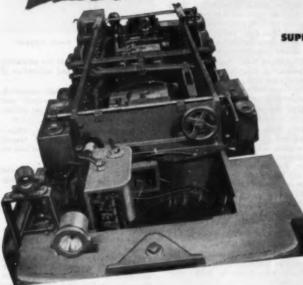
(360) Allied Chemical & Dye Corp., Solvay Sales Div., New York 6—Solvay calcium chloride for underground haulage roads.

(361) American Mine Door Co., Canton 6, Ohio—"Little Chief" rockduster available on rubber tires or equipped with winch for pulling itself on or off belt conveyors; "Mighty Midget" rockduster, rubber-tired mounted.

(362) Baker-Raulang Co. and J. H. Fletcher & Co., Huntington, W. Va.—Baker Trike for personnel transportation in low coal.

(363) Brown-Fayre Co., Johnstown, Pa.—New 35-man 8-wheeled double-truck man-trip car especially designed for comfort and convenience and featuring rubber-cushioned axle mountings and spring bolsters; hydraulic

Whatever your Mine Locomotives need to keep them in good running condition NATIONAL ELECTRIC COIL CAN DO!



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SUPPLYING REPLACEMENT COILS

MOTOR OVERHAULING

CONTROLLER REPAIRING

MECHANICALLY DAMAGED MOTOR REPAIRING

> SPLIT FRAME MOTORS MADE INTO SOLID FRAME MOTORS

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The National Electric Coil Company was born in the coal mining field. Our first plant, in Bluefield, West Virginia, and our new plant in Harlan, Kentucky, are equipped and manned primarily for service to the mining industry. Key people are "graduates" of work in the mines. Either plant can handle any mine locomotive job, from continuous-weld tire tread rebuilding to complete locomotive rebuilding. Overflow coil and motor work from

either plant is done in our Columbus, Ohio plant.

Locomotives can be delivered to us via our truck or yours, or by flat car. Motors can be rewound in your shop or ours. And National electrical work is done with a full knowledge of the rugged life of electrical apparatus in mining.

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COSUMBUS 16, OHIO, U.S. A.



Brown-Fayro 35-man 8-wheeled man-trip car.



Lee-Norse mine "Scooter."

brakes on one truck; seat backs arranged to provide space for dinner buckets, etc.; and provisions for handling stretchers through doors in front of car for operation as ambulance when necessary.

(364) Calcium Chleride Association, Washington 6—Calcium chloride for shuttle-car runways; other dust-allaying applications, fire protection and ice control.

(365) Differential Steel Car Co., Findlay, Ohio—Differential man-trip

(366) Ensign Electric & Mfg. Co., Huntington, W. Va.—Ensign trolleyguard support.

(367) Elliott Service Co., Inc., Mt. Vernon, N. Y.—Safety poster service.

(368) Farmers Engineering & Mfg. Co., Pittsburgh 21—New smaller Femcot rolleyphone with plug-in parts for easier maintenance in AC, DC or battery types for mining.

(369) John Flocker & Co., Pittsburgh 30-Plastic trolley guards.

(370) Fyr-Fyter Co., Dayton 1, Ohio—Portable fire extinguishers, including Karbaloy instant-model equipment for mounting on fire cars; and new stainless-steel dry extinguishers in 10-, 20- and 30-lb sizes for flammable liquids such as oil, gas and paints, featuring steel-aluminum construction for light weight and strength, large refilling opening, and concave-bottom design guaranteeing full discharge.

(371) General Electric Co., Schenectady, N. Y.—G. E. mine phones and stationary mine-lighting fixtures.

(372) Lee-Norse Co., Charleroi, Pa.

—New Lee-Norse "Scooter," a "halfsize" carrier built for low-cost transportation of mine personnel and using standard Mine-Jeep parts; plus Model TJ1 Mine Jeep for track transportation of key mine personnel or officials.

(373) Manu-Mine Research & Development Co., Reading, Pa.—Portable automatic car stop; dust-control equipment; reflectorized tunnel paints and fire-retardant paints.

(374) Martindale Electric Co., Cleveland 7-Martindale dust masks.

(375) Mine Safety Appliances Co., Pittsburgh 8—New self-rescuer with replaceable canister about 1 lb lighter; all-electric ateam cleaner with no open flame; Pneolator resuscitator; Edison R-4 cap lamps and Wolf safety lamps; other safety and protective equipment of all types.

(376) National Mine Service Ca., Beckley, W. Va.—Wheat cap lamps; Koehler flame safety lamps.

(377) Quaker Rubber Co., Philadelphia-Mine trolley guard.

(378) Raybestes - Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J. —Trolley-wire guard in both rubber and plastic.

(379) Safety First Supply Co., Pittaburgh 19—Complete line of safety equipment, such as, rail clamps, welding helmets, safety belts, lights, portable drinking fountain and self-contained breathing apparatus, including the following new equipment: Bullard colored miners' caps and hats including a phosphorescent white hat; Frommelt portable welding safety shield; Willson respirators; E. & J. resuscitators; J. & W. gas indicators and alarms; Treesdale safety clothing; and Dow Chemical goggle-cleaning station.

(380) U. S. Rubber Co., Mechanical Goods Div., New York 20-Trolleywire guards.

Mining Specialties and Services

(381) American Air Filter Co., Inc., Louisville 8, Ky.—Cycoil oil-bath air cleaner; CMS multiduct automatic self-cleaning air filter.

(382) Baltimore & Ohio R.R., Cleveland 13—Bituminous-coal utilization.

(383) Bituminous Coal Institute, Washington 5, D. C.—Printed and



Bowdil telescoping transit support.

other material available for education of public on mining and utilization of bituminous coal.

(384) Bituminous Coal Research, Inc., Pittsburgh 22—Research and equipment development in coal utilization and mining equipment.

(385) Bowdil Co., Canton, Ohio-New aluminum telescoping transit support for faster setups and less interference with production.

(386) Coal Mine Equipment Sales Co., Terre Haute, Ind.—Mining equipment.

(387) Elliott Service Co., Inc., Mt. Vernon, N. Y.—Management Information Service.

(388) Manu-Mine Research & Development Ca., Reading, Pa.—New method of chemical treatment of fluid soils, solidifying them up to a bearing capacity of 75 tons per sq ft for sand; soil, with penetration up to 80 ft, use for mine shafts, tunnels, tipple and shop foundations, and water-retaining walls.

(389) Schroeder Bros., Pittsburgh 1
—Products of the American Air Filter
Co., Chicago Pneumatic Tool Co., Clark
Controller Co., LeRoi Co. (Cleveland
Rock Drill Div.), Ensign Electric &
Mfg. Co., Reliance Electric & Engineering Co., U. S. Rubber Co.

(396) Tamping Bag Co., Mt. Vernon, Ill.—Weed and brush killer for mine use.

(391) U. S. Steel Co., Pittsburgh— Gunnison homes for mining communities.

(392) S. K. Wellman Co., Cleveland 3—"Velvetouch" powdered-metal friction material for clutches and brakes on loaders, cutters, tractors, trucks and other mining equipment.

FOR MORE INFORMATION on any product covered in this Coal Show Report, write in the paragraph number on the postagefree card facing p 140 and mail to COAL AGE. "Tycol Acylkup keeps bearings running cool... does not emulsify with water"



That's right! Tycol Acylkup Grease withstands heavy unit pressures... resists emulsification with water. It is easily applied by grease gun or central system.

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COAL AGE . June. 1951

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This is the kind of an advertisement that an advertising person can write in only one place . . . in his hotel room in Cleveland . . . immediately after spending hours touring and thrilling to the marvelous exhibits.

Here was dramatic and potent tribute to American mechanical and productive genius.

When you left the Show you took with you a new feeling of confidence in the genuine might of America. You could forget for the moment the military bickerings about the Korean problem.

And somehow, down deep, you feel now that while enemy countries may threaten our country with disaster, American brawn and brain, as exemplified by the Coal Mining Industry and its unity of purpose, comprise a warning force that cannot be ignored by any potential invader.

Yes, Heyl & Patterson is proud to have been a participant in the Mining Congress Show, and proud, too, to be a contributor to the constructive plans of the Coal Mining industry.

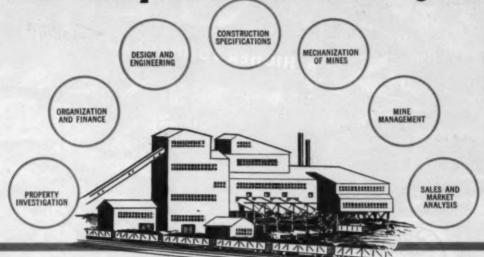
Ore Bridges
Railroad Car Dumpers
Halb Lift-Turnovor-Rufary
Coal Preparation Plants
Coal & Code Handling Equipment
Beat Loaders and United Beat Loaders
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Coal Storage Bridges
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Railford Broakers
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That is our business, and we specialize in it. Here, at your service, is an organization of practical engineers and operating men who know the complex problems of the mining industry from actual practice. Their mature judgment and skill which comes from such wide-spread activities can be focused upon your problems so that difficult executive decisions may be made with assurance.

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Trabon oil and grease systems give positive lubrication on coal crushers, washers, shakers, conveyors, and underground equipment.

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Rugged construction for long service life...trouble-free service on the dirtiest jobs . . , one indicator — with no exposed moving parts—to give proof that every bearing is lubricated . . . these are the features that assure more profit for you. Call or write today.

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NCA Honors Top Safety Men in Washington Meeting

Coal-mine supervisors and foremen with safety records showing no losttime accidents among their crews for 4 yr or more were honored by the Safety Division, National Coal Association, at the second annual two-day Safety Award meeting in Washington,

D.C., May 11-12.

Out of 168 men known to have made accident-free records of 4 yr or longer, 53 attended the Washington meeting and accepted their certificates from Earl Maize, director, NCA Safety Division. In making the presentations, Mr. Maize declared that care and good foremanship are the elements of a good safety record. He reported that nearly 1,500 supervisors known to NCA have accident-free records of one year. Certificates will be mailed to these 1,500 men, as well as to the plus-d-yr men who could not attend the Washington meeting.

The two-day schedule in Washington included a tour of the Laboratory Roof Bolting Section, U.S. Bureau of Mines, College Park, Md., a visit to the Capitol and other points of interest in the city, a big-league baseball game and the award luncheon. Speakers at the luncheon were Ralph Mulligan, director, Bituminous Coal Institute, who also was toastmaster; Mr. Maize; R. E. L. Hall, NCA general counsel; and Bernard Suttler, special agent, Federal

Bureau of Investigation.

Award winners attending the luncheon and other events in Washington

were as follows:

Amherst Coal Co.—Gaither Knight; Ayrshire Collieries Cerp.—Delbert Baker and Charles Evans; Consolidation Coal Co. (Ky).—L. N. Akers, Robert Kyle, Rex Lawrence and George Morgan.

Eastern Gas & Fuel Associates— George Blake, Erneat Caldwell, H. L. Dodd, L. M. Douglas, Clyde Gilbert, Thurman Graham, G. J. Lewis, Hayes Maynard, Smith Miller, E. S. Myers

and C. H. Robinette.

Hanna Coal Co.—D. P. Applegarth, William Aspenwall, Mike Bilica, Joseph Busie, John Kornetti, Robert McCormick, H. H. Mulligan, Stanley Obejenski, Bernard Sonego, Richard Strickler, Ralph Trimbath, Ralph Wheeldin and William F. Wilson.

Howard Collieries—A. E. McClellan; Inland Steel Co.—W. A. Pack and T. E. Sullivan; Island Creek Coal Co.— Everette Adkins, Alex Matney, Earl Nichols and Jesse Ray; Lorado Coal

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Mining Co.—Jason Brown; Marianna Smokeless Coal Co.—F. M. Shumate; Olga Coal Co.—Lloyd Hinkle.

Pond Creek Colliery—Hayes Hilton, Burton Jones, Kenner McCoy and John Zsoldos; Pond Creek Pocahontas Co.—Ed Campbell; Powhatan Mining Co.—Aaron McDermott and Robert Minder; Princess Elkhorn Coal Co.—Wilmar Branham; Red Jacket Coal Corp. — Grover Bradford, Haywood Dean and T. D. Jordan; West Virginia Coal & Coke Co.—Walton Blair.

In addition, the following safety directors attended: Arthur Bradbury, Inland Steel Co.; J. J. Plasky, Red Jacket Coal Corp.; C. E. Linkous, Island Creek Coal Co.; Joahua Smith, Eastern Gas & Fuel Associates; William Norris, Olga Coal Co.; Marshall E. Prunty, Consolidation Coal Co. (Ky); W. J. Schuster and William Douglas, Hanna Coal Co.; Mike Rydoss, Powhatan Mining Co.; and Steve Younger, Pond Creek Colliery, Nerfolk & Western Ry.

Ohio Group Gives Nod To Coal Pipeline

The Ohio Senate April 30 passed and sent to the House of Representatives a bill granting eminent domain to coal pipeline companies. If passed by the House, the new law would permit condemnation of lands needed for pipeline right-of-way, give public-utility status to coal-pipeline companies and flash a go-ahead for Hanna Coal Co's. recently-announced project, a contemplated \$6,000,000 underground pipeline to carry coal from Ohio mines to Cleveland and Lake Erie markets.

Hanna now is building a 3½-mi experimental pipeline at the Georgetown cleaning plant, near Cadis, Ohio, at a cost of \$550,000. The experimental line will provide data on optimum size of coal, possible pipeline erosion, quantities of water needed, power requirements and cost. At present, Hanna officials believe they can pump 7,000 tpd from mine to consumer at \$1 per ton less than railroad haulage costs.



TOP SAFETY LEADERS honored at NCA meeting included: C. H. Robinette (left), Wharton No. I. E68FA, 8 yr without an accident; Ernsst Caldwell, Morris Creek project, E68FA, 9 yr: Earl Meize (center), NCA safety director; George Blake, Stotesbury No. 11, E68FA, 9 yr; and F. M. Shumate, No. 1 mine, Marianna Smoksless Coal Co., 9 yr.







OLD TIMERS' AWARDS are presented by George H. Deike to George Laroy May (left), KENTUCKY AWARD is presented by S.M. University of Pittsburgh, and Stoddard S. Burg (right), Penn State College.

Cassidy (right) to Billy Frazier Eads.

Old Timers' Club Honors Three Mining Graduates

MINING - ENGINEERING TOP GRADUATES of three schools recently received engraved gold watches as the annual award of the Old Timers' Club to the outstanding mining-engineering graduate selected on the basis of scholarship, character and promise of success in the profession. In ceremonies at Penn State College and the University of Pittsburgh (above) held April 25 and 26, respectively, George H. Deike, president of Mine Safety Appliances Co. and secretary of the club, made the presentation. Presentation at the University of Kentucky, during Engineers' Day May 3, was made by S. M. Cassidy, president, Consolidation Coal Co. (Ky.), Div. of Pittsburgh Consolidation Coal Co.

Recipient at the University of Pittsburgh was George LeRoy May, of Nanty Glo, Pa. Speakers at the presentation, held during an assembly of Engineering and Mines students, included: Dr. L. E. Young, consulting engineer; L. G. Campbell, vice president, EG&FA; and M. D. Cooper, director, NCA mining-engineering education. Officials of the university participating were: Dr. R. H. Fitzgerald, chancellor; Prof. H. E. Dyche, acting dean of the schools; and Prof. E. A. Dines, acting head of the Department of Mining Engineering.

At Penn State, presentation of the watch to Stoddard S. Burg was made at a Mining Society banquet at which Dr. Young was the principal speaker.

Award winner at the University of Kentucky was Billy Frazier Eads, son of Mr. and Mrs. Everett Eads, Sr., Acme, W. Va.





Bloodmobile Visits Hudson Coal Collieries

REPLYING to a call for blood donors from two local chapters, American Red Cross, The Hudson Coal Co., Screnton, Pa., converted its Lorse, Olyphant and Marvine colliery offices into temporary hospitals for the use of bloodmobile personnel. In one day at Lorse, 140 Hudson Coal employees each donated a pint of blood, while 258 employees of Olyphant-Eddy Creek colliery were willing donors during the two-day visit of the bloodmobile. Response at Marvine also was gratifying. Blood Donor Day at Loree, Dec. 21, 1950, marked the first visit of the bloodmobile to an anthracite property. Above, Anson Bidwell (left) outlines his medical history to nurse before donating blood, as N. Stedine (right) complates his donation.

Personal Notes

Peter P. Kerr, general superintendent of the New River & Pocahontas Coal & Coke Co., Berwind, W. Va., recently retired after some 20 yr in that post and a record of 56 yr in coal mines of Pennsylvania and West Virginia. Born in Scotland, Mr. Kerr came to western Pennsylvania with his family at the age of 7 and went into the mines 2 yr later. His only accident during these many years was a foot injury in a man-trip accident while still a boy in Pennsylvania. W. H. Amick, assistant general superintendent for the company, has been named to succeed Mr. Kerr.

Earl R. McMillan, assistant manager and chief engineer of coal mines for the Northwestern Improvement Co., Roslyn, Wash., has been named manager of coal operations and chief engineer, succeeding the late Thomas Murphy. Frank Badda, superintendent at Roslyn, has been promoted to general superintendent for the company.

Several personnel changes among officials of the Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., have been announced. J. F. McCall, formerly superintendent of the Buck Run col-

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When your engine operates below its efficiency range . . .
When the driver can't make the next higher shift because of grade or load . . .
When the driver must shift two levers to keep the load rolling . . .
Then you are wasting time, horsepower and fuel.

With the new Fuller ROADRANGER and easy because there is no gear get the maximum borsepower from Transmission, you stop all three, and splitting and no waiting. your engine all the time. increase your profit per trip. Ask the man who has driven one. Engines can always operate in their Each shift is short, sure most efficient range because there are Then, for better truck performance at 10 speeds forward in usable ratios ... lower operating costs, specify a Fuller spaced in selective, progressive 28% ROADRANGER Transmission in your One lever controls next rig. Write today for complete steps. Yes, you can save fuel with a 10 speeds details and specifications Fuller ROADRANGER . . . by using it to ROADRANGER - Model R-95-C

FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wis. . WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.









Pittsburgh Consol Advances Four Executives

PROMOTION OF FOUR TOP OFFICIALS of Pittsburgh Consolidation Coal Co., effective May 1, has been announced by George H. Love, president. G. A. Shoemaker (top left), president of the Pittsburgh Coal Co. Div., was elected a vice president of the persident of the persident of the president of the president of partial president, succeeding Mr. Shoemaker. Walter F. Shulten (lower left), assistant to J. B. Morrow, who retired in April as first vice president, was elected a vice president of Pittsburgh Consol. J. M. Knowles (lower right), coordinator of purchases, was elected a vice president of the parent company. The three new vice presidents will be located at the company headquarters in Pittsburgh and Mr. Rose will have offices at Library.

liery, has been named assistant to Vice President George A. Roos in the preparation and handling of grievances before the Anthracite Board of Conciliation, succeeding Francis W. Chesney, recently appointed superintendent of the company's Ashland Div. Clarence O. Whaite has been made superintendent at Buck Run, to succeed Mr. McCall. Francis O'Connor, formerly assistant foreman, has been advanced to mine foreman at the company's Porter Tunnel operation, replacing Peter Hino, resigned. James Holley has been appointed fireboss at Porter Tunnel.

Fred A. Miller has been appointed superintendent of the new Orient No. 3 mine of the Chicago, Wilmington & Franklin Coal Co., Waltonville, Ill., succeeding Kenneth M. Rodenbush, resigned. Mr. Miller formerly was general superintendent for the Consolidated Coal Co., Staunton, Ill.

Donald Johnston, superintendent of the Mark Twain mine of the Huntaville-Sinclair Mining Co., has been named general superintendent of the eastern division of the Sinclair Coal Co., in charge of operations at the company's five mines in Indiana and Illinois. Mr. Johnston, who has been with the company for 20 yr, will have his headquarters in St. Louis. Obie Dilldine has succeeded him as superintendent at Huntaville.

L. H. Johnson, superintendent, Mine

No. 43, has been appointed safety engineer for the Peabody Coal Co., replacing the late D. F. McElhatten. Richard Griffiths, superintendent at Mine No. 47 until its recent closing, has been appointed superintendent at No. 43 to succeed Mr. Johnson.

C. E. Walker has resigned as general manager of Pond Creek Pocahontas Co., it has been announced by James L. Hamilton, vice president in charge of operations. In making the announcement, Mr. Hamilton said that Mr. Walker's resignation was accepted with reluctance and that his position would not be filled since operating managers of the various divisions would report directly to the operating vice president in the future.

Edward G. Fox has been elected president of the Philadelphia & Reading Coal & Iron Co., to succeed the late Ralph E. Taggart. Mr. Fox, who joined P&R in 1946, had been advanced from general manager to executive vice president of the company in April.

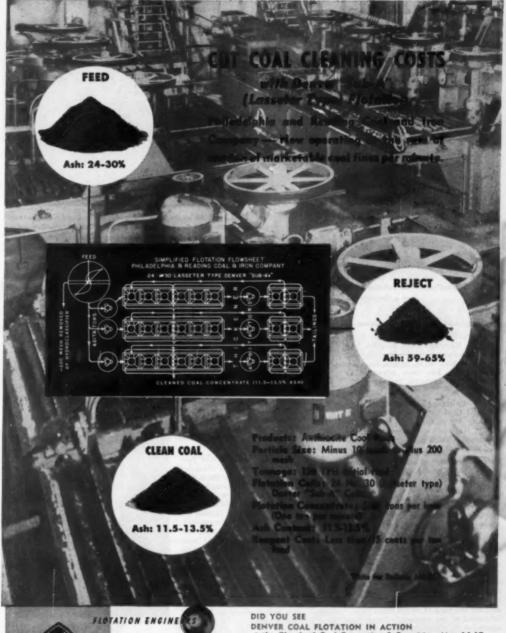
Arthur Waldman, assistant general superintendent since 1947, has been named general superintendent of the Uniontown, Pa., district of the Coal Div., U. S. Steel Co., succeeding John L. Sullivan, resigned. A mining-engineering graduate of Lehigh University, Mr. Waldman was first associated with the U. S. Steel Co. in Birmingham and later was transferred to T.C. J&R.R.

J. S. Whittaker, formerly mine-reacue director, has been promoted to director of safety for the Pittsburgh Coal Co. Div., Pittsburgh Consolidation Coal Co., succeeding R. H. Nichols, who retired April 30. A graduate of the Colorado School of Mines, Mr. Whittaker has been associated with Pittsburgh Coal since 1939.

R. E. Snoberger last month was named executive vice president and a director of the Truax-Traer Coal Co. Mr. Snoberger, who has been president of Binkley Coal Co., a Truax-Traer subsidiary, will continue as a Binkley vice president, Gregory S. Devine, formerly vice president, was elected president of Binkley Coal.

Jesse G. Bowers has been appointed superintendent, Everettville mine, Consolidation Coal Co. (W. Va.), Div. of Pittsburgh Consolidation Coal Co., succeeding R. W. Davidson, resigned. George L. Judy has been named superintendent at Williams mine, succeeding Mr. Bowers.

Personnel changes announced by the Island Creek Coal Co. include the promotion of R. H. Tinsley from mine foreman, Mine No. 27, to assistant superintendent, Mine No. 1, replacing E. E. McBurney, previously transferred to superintendent, Mine No. 20. At Mine No. 27, Milburn Hall has been advanced from night foreman to mine foreman, succeeding Mr. Tinsley. Henry Skiba has been promoted from assistant mine foreman to night foreman, and John Swetman from section





DENVER COAL FLOTATION IN ACTION at the Claveland Coal Convention & Exposition, May 14-17.

Write for descriptive literature on the Philadelphia & Reading operation and the complete Denver Flotation process seen at the Cleveland Coal Canventies & Experition.

The form that makes the fricance happen, healther and mealthing the form that the control of the form that the control of the form that the control of th

DENVER EQUIPMENT CO., 1403 Seventeenth St., Denver 17, Colorado



1951—TWO PIONEERS in mechanical leading snapped recently in the service shop of the Westinghouse Electric Corp., Huntington, W. Va., as T. W. Mitchell (left), machinist with Westinghouse, and Harry S. Gey, vice president and general manager, Gey Coal & Cake Co., and Gay Mining Co., look at a 1923 photograph (right) of the Holmsted loader being given a trial in the Gay mine, Mt. Gay, W. Va. Mr. Gay was then general superintendent at the mine and Mr. Mitchell supervised building of the machine and followed it as a demonstrator.



1923—TRIAL of the Helmsted loader in the Island Creek seam, Gay Coal Coke Co., near Logan, W. Ve., which was the first reil-road-shipping operation (1904) in the Logan field. Harry S. Gay Sr., then general manager and elimining engineer, speaking in 1907 before the Institute of Mining Engineers in London, England, made the then asteunding prophecy that some day the loading of coal would be handled mechanically. The Gay mine was mechanized with Joy leading machines about 1925. (Photo by Joe Rimkus, Logan BANNER.)

foreman to assistant mine foreman.

Robert E. Mitchell, general mine foreman, Keystone mine, EG&FA, has been transferred to Eciles mine as superintendent. A. H. Strele, foreman at Keystone, has been advanced to general mine foreman, replacing Mr. Mitchell.

J. M. Coleman, associated with the Imperial Coal Corp. in a supervisory capacity for some 34 yr, retired recently. He was superintendent of the company's Cardiff mine on retirement.

Stanley D. Michaelson, chief engineer for the coal mines division, Tennessee Coal, Iron & R.R. Co., Birmingham, Ala., has been appointed to the newly created position of chief engineer, raw-materials division. Mr. Michaelson joined TCI in 1947 as a special coal-washery engineer and was made chief engineer a year later.

Paul O. Hamer, associated with the Hatfield Campbell Creek Coal Co., Reed, W. Va., for the past 23 yr, has opened an office in Charleston, W. Va., from which he will be available for consulting work in all phases of mining. Mr. Hamer was chief engineer for Hatfield Campbell Creek for 9 yr and for the past 14 yr has been superintendent of the company's Point Lick operation at Rensford.

Leopold D. Silberstein has been elected president of the Pennsylvania Coal & Coke Corp., succeeding Joseph T. Berta. Mr. Silberstein, also president of Uno Equities Co., was one of six non-management directors elected earlier last month to take over control

of the company. Mr. Berta and Ralph Wolf also were elected to the board as management candidates. Mr. Berta will continue with the company as consultant.

Stuart H. Levison, since 1930 general manager of sinc and coal operations for the American Smelting & Refining Co., has been elected vice president in charge of those operations. Mr. Levison, who has been associated with company since 1912, will continue to make his headquarters in New York.

John V. Freeman, who retired Feb. 28 as director of the coal chemical sales division of the U. S. Steel Co., has opened offices as a consultant at 45 Rockefeller Plaza, New York 20, for work on the technological phases of coal and coal chemicals. During his 43 yr with the U. S. Steel organization, Mr. Freeman has had wide experience with the chemistry of coal, coal beneficiation and carbonization and the production of coal chemicals. A member of various chemical societies and a recipient of several patents, Mr. Freeman is well acquainted with coking-coal and by-product cokeoven plants in this country and has visited such installations in England and Western Europe.

J. E. Biggs, Jr., formerly president, has been elected chairman of the boards of the H. E. Harman Coal Corp. and the Feds Creek Coal Co., Inc., Tazewell, Va. I. J. Richardson, previously vice president, was elected president and general manager of the companies to succeed Mr. Biggs.

The retirement of Hugh T. Wilson as president of the Norfolk & Chesapeake Coal Corp., with operations at Logan, W. Va., recently was announced J. E. Biggs Jr., chairman of the boards of the H. E. Harman Coal Corp. and the Feds Creek Coal Co., Inc., was elected president to succeed Mr. Wilson.

Obituaries



Ralph E. Taggart

Ralph E. Taggart, 64, president of the Philadelphia & Reading Coal & Iron Co. since 1935, died in his sleep May 1 of a heart attack at his home in Radnor, Pa. While his death was unexpected, he had been in poor health (Continued on p. 181)

FOR HEAVY-DUTY CONVEYORS ...



IT'S TIMKE

Timken equipped Continental Idlers manufactured by the Continen-tal Gin Company insure minimum maintenance on this 36" belt conveyor handling "run of mine" coal. Timken bearings are standard in Continental Idlers.

AND TIMKE

This Timken bearing equipped Link-Belt installation is the longest single belt conveyor in the world - 10,900 feet from foot pulley to head pulley.



Limestone moves at a rate of 350 tons per hour over this 3795-foot Barber-Greene four-belt system. Belt wear is reduced, idlers turn freely on 8,566 Timken bearings.

AND HERE ARE 6 BIG REASONS WHY:

- THOROUGHLY PROVED. The Timken® bearing is the only tapered roller bearing proved by 15 years or more of service in heavy duty conveyor installations using the popular dead-shaft construction.
- EXTRA CAPACITY. Line contact between rollers and races gives Timken bearings extra load-carrying capacity. And by using Timken bearing sizes that are mass produced for the auto industry, you get bearings that actually cost less than smaller sizes you'd normally use.
- LONG-LIFE LUBRICATION. Not just lubricated for 'life" but lubricated periodically as conditions require to insure long life. Fresh lubricant at regular intervals ends gummy, sticky, jammed bearings.

- FRICTION MINIMIZED. Timken bearings' true rolling motion and extremely smooth surface finish practically eliminate friction.
- LONGER ROLLER AND BELT LIFE. Less sliding and scuffing between idlers and belt.
- MAINTENANCE REDUCED. Long life and dependable performance of Timken tapered roller bearings cut

Remember "Timken" is not a bearing type. It is a trademark applying only to bearings made by The Timken Roller Bearing Company. It will pay you to always specify Timken bearings for heavy-duty conveyors. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

Wherever the going's tough industry turns to

TAPERED ROLLER BEARINGS



NOT JUST A BALL 🕙 NOT JUST A ROLLER 💭 THE TIMKEN TAPERED ROLLER 🗀 BEARING TAKES RADIAL 🛈 AND THRUST— 🗓 — LOADS OR ANY COMBINATION — 👸



NCA Marks Advances, Scans Prospects

Bituminous Girds to Attack Problems As Nation Moves Toward Defense Footing-NCA Committees and Divisions Report Actions to Protect and Strengthen Coal on All Fronts—BCI and CHS Achievements Spotlighted

COAL'S DEFENSE ROLE: the industry's programs for better public relations, merchandising and re-search; and problems of taxation, competition and safety-these were top subjects as 350 coal executives and representatives of related interests met at the 1951 convention and business meeting of the National Coal Association in New York City, April

R. H. Knode, president, Stonega Coke & Coal Co., Philadelphia, was re-elected president of the association and William H. Cooke, president, Little Sister Coal Corp., Chicago, and chairman, Coal Defense Committee,

was named a new vice president.

J. B. Morrow, retiring first vice president, Pittsburgh Consolidation Coal Co., and recent president, Bituminous Coal Research, Inc., was presented a scroll bearing a BCR resolution in his honor at ceremonies on the day preceding the convention, when committees and the board of directors of NCA met.

"The coal industry is in the forefront of the war-production effort and we can be justifiably proud of the record of performance," Mr. Knode said in making the president's address. His review of NCA activities in the 18 mo since the last meeting followed an address of welcome by W. J. Dun-can, chairman of the New York committee and district manager, Coal Division, Eastern Gas & Fuel Associates. O. L. Scales, vice president, Enos Coal Mining Co., Indianapolis, presided.

Predicting that bituminous would

mine 550,000,000 tons in 1951 to meet defense and export needs, Mr. Knode urged wider use of machines to in-crease labor productivity and hold down costs. He summarized past achievements and current problems as follows: "Our labor relations have greatly improved; the industry's better safety record is a noteworthy achievement; the impact of the war economy, the increased needs for coal. and the uncertainties that surround the supply of oil and natural gas as wartime pressures continue have strengthened coal's competitive position. But on the other hand we have had to contend with a flood of residual oil from Venezuela and Arabia; we have been faced with freight-rate increases which could be very damaging; we have been handicapped in meeting rising costs of capital equipment with a thoroughly inadequate depletion allowance in our tax structure; and now with metals and rubber and other critical materials under government control, we have serious questions of supply of these things for mining operations."

The organization's working capital as of March 31, 1951, totaled \$2,034,-629, with assets of \$2,041,056 and liabilities of \$6,427, said E. H. Davis,

NCA treasurer and president, New York Coal Co., Columbus, Ohio. John D. Battle, NCA executive vice president, pointed out problems ahead of the industry as follows: materials and supplies, manpower, taxes, percentage depletion rates, and imported oil. He pledged the association's continued efforts in behalf of the industry as these and future problems unfold.

"More Light on Coal" was the theme of a review of activities of Bituminous Coal Institute since the last NCA meeting. Four speakers shared in the BCI presentation: Ralph C. Mulligan, director; J. H. Cunningham, administrative assistant; Dr. M. Edmund Speare, educational director; and H. F. Douglas, vice president, Benton & Bowles, Inc.

Announcing the start of a dramatic new documentary film on mining, preparation, distribution and utiliza-tion of coal, financed by \$100,000 of BCI funds and produced by "The March of Time," Mr. Mulligan sum-marized BCI's work in advertising, radio, motion pictures, the Speakers' Bureau, Press Information Section, and educational and textbook projects. BCI new provides coal-county and coal-state weekly and daily newspapers with information and materials about the industry. In addition, Mr. Mulligan stated, BCI maintains close liaison with Bituminous Coal Research, Inc., and with NCA's commit-

tees on land use and air purification. Turning to the Bituminous Coal Annual, the 1951 edition of which now is in preparation, he reported distribution of the books as follows: 40% within the industry; 25% to press, radie and magazine editors; 20% to bank, railroad and utility executives and government agencies; 10% to col-lege and public libraries; and 5% to

special requests. The BCI Speakers' Bureau has arranged 267 speaking engagements in the past 9 mo, bringing the total to 1,741 speeches programmed since the organization was started in 1946, Mr. Cunningham reported. Though speakers are listed by the bureau, still more are needed, especially in areas not now reached. Commenting on BCI's two films, "The Magic of Coal" and "Underground Adventure," Mr. Cunningham said that the former has been seen by over 3,000,000 people plus television audiences and that the latter has had wide circulation in schools and vocational-guidance groups.

The interest of teachers is enlisted through advertisements in teachers' magazines and through personal contacts and displays at educational meetings, Dr. Speare said. Much of the educational department's work is done through distribution of booklets and picture books-for example, Coal at Work, and A Down-to-Earth Picture of Coal, which have totaled 234,000





R. H. KNODE (left), president, Stonege Coke & Coal Co., was re-elected NCA president. W. H. Cooks, president, Little Sister Coal Corp., and chairman, Coal Defense Committee, was named a new vice president,

copies to date. A coal-resources map now is being prepared for use in schools, he said. The department also provides feature articles and materials for magazines distributed to school children and is at pains to see that information about coal in textbooks, encyclopaedias and magazines is correct

BCI's advertising campaign appears in professional trade papers for press and radio men, teachers' journals, general news magazines, farm publications, and business and industrial magazines, Mr. Douglas explained. For every dollar spent for BCI advertising. the industry reaches between 150 and 200 people, he said.

Commenting from the floor, B. E. Urheim, executive secretary, American Retail Coal Dealers Association, said that retailers would like to see BCI advertising directed more toward coal customers. The industry must get its story across to school boards, janitors, engineers and architects and must keep abreast of news about proposed building and construction, he argued.

"The human element which may cause an accident or a catastrophe is always at hand. Only a ceaseless fight for safety can eliminate the accidents," declared L. C. Campbell, chairman, NCA Safety Committee, and vice president, Eastern Gas & Fuel Associates, Pittsburgh. Mr. Campbell was the first speaker at the afternoon session, K. A. Spencer, president, Pittsburg & Midway Coal Mining Co., Kansas City, Mo., presiding.

Safety-committee members and Earl Maize, director, NCA Safety Division, have promoted safety training, conwith state mining officials, sought interpretations of contract and safety-code clauses, addressed meetings and circulated posters and other safety materials, Mr. Campbell reported.

Educating the public to the fact that coal is only a small part of air pollution and that smoke is waste is the major function of NCA's Air Purification Committee, said R. L. Ireland Jr., committee chairman and chairman of the executive committee. Pittsburgh Consolidation Coal Co., Cleveland, Ohio. The committee is working closely with the Air Purification & Smoke Prevention Association, he said. This organization represents several industries-ferrous and nonferrous metals, coal, oil, railroads, marine shipping, equipment manufacturers, etc.

"Other industries, or individual corporations, spend annually on one project more money than we spend annually on some 30 projects," said J. E. Tobey, chairman, Technical Advisory Board of BCR, and president, Appalachian Coals, Inc., Cincinnati. By entering into cooperative agreements with other industries, however, coal is able to increase funds expended for research, he pointed out.

(Continued on page 204.)



BCR Directors Honor Morrow for Service to Industry

JAMES B. MORROW (left) receives a special citation for his "invaluable services to a great American industry" from the board of directors of Bituminous Coal Research, Inc., at a meeting of the board held during the annual NCA meeting April 19. The presentation was made by Barton R. Gebhart, vice president of the Chicago, Wilmington & Franklin Coal Co. and a BCR vice president and director. The embossed resolution, passed by the board a month earlier but held from Mr. Morrow's attention, also states that "his enterprise, vision and unfaltering faith were largely responsible for the growth of this organization. His leadership and wise counsel have been of inestimable value to the research activities of the whole bituminous coal industry." Mr. Marrow, who retired this spring as first vice president of Pittsburgh Consolidating Coal Co., is a former president of BCR and retired as a director of the organization in March.

Coal Exporters See Bigger Markets Abroad

Coal exports to Europe began gaining volume soon after the start of the Korean war and now are running at a rate of 18,000,000 tons per year, members of the Coal Exporters Association of the United States, Inc., were told at their annual meeting in New York City, April 19.

The upsurge in exports to Europe is attributable to increased industrial activity in European countries and a build-up of dollar balances growing out of commodity shipments to the United States, said John S. Routh, association president and president, Routh Coal Corp., New York. Mr. Routh reviewed the association's continuing studies of markets abroad and its relations with the Economic Cooperation Administration. He forecast a substantial volume of exports over the next several years.

Great Britain took about 20% of the total of 5,028,000 tons of coal sent overseas in the first 3 mo of 1951, said F. F. Estes, executive secretary, Free dollars paid for most of this coal ECA dollars being available only for coal bought by France, Denmark and Iceland.

Port allocations such as were imposed at the peak of coal exports i 1947, are not now needed, said D. T Buckley, chairman, government rela-tions committee, and assistant to the president, Castner, Curran & Bullitt, Inc., New York City. This committee was instrumental in obtaining a sup plemental price order permitting certain markups to coal producer-expor ers and export merchants, Mr. Buck lev reported.

Railroad car supply will be tight for the next several months, said C. Magee, Car Service Div., Association of American Railroads. Mr. Magee e plained that coal movements to the Great Lakes plus large movements ore, especially all-rail ore shipment will put a heavy load on railroad though most of the extra cars need will be provided by western roads. T railroads now have 36,000 hopper a 32,000 gondols cars on order and has reduced bad-order cars by 25%.

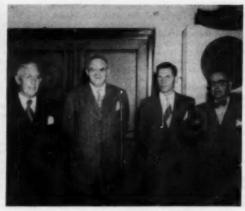
Other significant reports were made by J. W. Haley, general counsel of the association and vice president, Jewell Ridge Coal Corp., who commented on congressional hearings on excess profits taxes, Interstate Com-merce Commission hearings on freight rates, Office of Price Stabilization hearings on coal prices and International Labor Office proposals to fix prices and quotas for foreign trade in coal; and by W. P. Anderson, chair-man of the association's transportation committee and vice president, Maritime Coal & Coke Corp., who stressed his committee's concern with freight rates, tidewater demurrage charges and port charges.

All Class A and Class B directors

were re-elected.



PUBLIC RELATIONS AND MARKET EXPANSION — E. H. Walker (left) and N. C. Curtin, Anthracite Institute; Owen G. Young, P.&R.; C. J. Lottridge and R. F. Fagan, Anthracite Institute.



MINING RESEARCH — D. E. Ingersoll (left), Philadelphia & Reading Coal & Iron Co.; John W. Buch and Andrew Allan, Anthracite Laboratory, Bureau of Mines; and R. S. Davies, P.&R.C.&l. Co.

Annual Anthracite Conference Views Market and Research Progress

NEW CAMPAIGNS in public relations and advertising; market-expansion possibilities in domestic-heating, agricultural, metallurgical and smokeabatement applications; and new techsiques in mining and preparation were subjects at the Ninth Annual Anthraite Conference, May 4, at Lehigh Unireraity, Bethlehem, Pa.

Themes of the first morning session ere public relations and advertising, etail-dealer assistance in anthracite promotion and increased market possibilities, discussed by E. H. Walker, vice president—public relations; N. C. Curtin, supervisor—field organization; R. F. Fagan, fuel and heating consultant, Anthracite Institute, New York, and C. J. Lottridge, field representative, Anthracite Institute, Ontario, Canada. Owen G. Young, northern sales manager, Philadelphia & Reading Coal & Iron Co., New York, N. Y., presided.

outlined some techniques now used by Anthracite Institute for converting laboratory stress on gears, worms and Btu's into terms like convenience and comfort to stimulate consumer demand.

The three-fold purpose of the current campaign to sell the advantages of anthracite heating is to hold the interest of present users, promote acceptance among potential users and increase public regard for anthracite

Pointing out that advertising is akin

to engineering in its reliance on static

laws and stringent rules, Mr. Walker

terest of present users, promote acceptance among potential users and increase public regard for anthracite as an industry. The campaign is designed to counteract the lack of direct contact with ultimate consumers, the lack of anthracite promotion by many dealers who also handle competitive fuels, and the negative influence of uninformed builders and architects on persons shopping for heating plants, Mr. Walker reported.

To supplement the anthracite message now directed to all levels via newspaper, radio and dealer advertising, a Saturday-evening television program, the Norman Brokenshire show, has been retained. The initial telecast of the show drew 3,500 responses from viewers, Mr. Walker reported, and these are directed to manufacturers of burning equipment for prompt follow-IB.

Declaring that the job of the Institute's field organization is to raise the standards of dealer service, Mr. Curtin listed some promotion devices for dealers as follows:

(Continued on page 206)



UTILIZATION RESEARCH — P. A. Mulcay (left), Anthracite Institute; C. C. Wright and D. W. Gillmore, Pennsylvania State College; J. W. Eckard, Anthracite Institute; C. G. Schantz, Westen Dodson & Co.; R. T. Gellagher, Lehigh University; and R. C. Johnson, Anthracite Institute.



HOUSEWIFE'S FEAR OF DUST

You can stop the fear that a coal delivery means dust in the basement and home of your customers by recommending oil-treated coal.

PERMATREAT has been proven the most effective means of dust-proofing coal. Treatment at the mine assures permanent control all the way to the consumer and until the last particle goes into the furnace. It will not wash away, holds dust and "fines" in suspension. It prevents much of the settling and provides a better burning coal whether hand or stoker fired.

It's easy to treat with PERMATREAT. This carefully compounded oil spray flows freely and covers adequately. The correct grade of PERMATREAT is available for either high pressure or hot oil systems. It can be applied economically at the mine. Write for complete information.

Ask your Supplier for Ashland



"PERMATREATED" COAL

ASHLAND OIL & REFINING COMPANY

Ashland, Kentucky

Among the Manufacturers

F. T. Bowman, until recently assistant general manager of The Bowdil Co., Canton, Ohio, has been named general manager to succeed his father, the late C. L. Bowman. H. M. Morrow, C. L.'s nephew, formerly chief engineer, has been made assistant general manager and will continue in his engineering and development capacity. Leroy D. Bowman, brother of Bowdil's late president, and active in the management since 1919, has been named vice president and treasurer.

Chain Belt Co., Milwaukee, has elected L. B. McKnight to the newly created position of executive vice president. Mr. McKnight has served in various managerial capacities since joining the company in 1927 and has been a vice president and director since 1948.

Whitney Chain Co., has elected James W. Anderson vice president, sales, and C. Robert Powers vice president, manufacturing. Mr. Anderson joined the company in 1938 in its Chicago branch and has been general sales manager since 1948. Mr. Powers was formerly consultant to the president on all phases of Whitney manufacturing activities.

Jeffrey Mfg. Co., at a meeting of the board of directors May 16, elected the following officers: R. H. Jeffrey, chairman of the executive committee; R. W. Gillispie, chairman of the board; J. H. Fulford, president; C. J. Letfeld, executive vice president; J. F. Davidson, vice president and treasurer; H. W. DeBruin, vice president in charge of manufacturing; J. A. Flint, vice president in charge of engineering; J. A. Jeffrey, vice president and manager of conveyor division; N. E. Salsich, vice president and manager of mining division; G. R. Lucas, comptroller; H. U. Andreae, secretary; reasurer.

John W. May has been named to succeed William Deans as chief engineer of the Switchgear Div., I-T-E Circuit Breaker Co., Philadelphia. Mr. Deans has been acting chief engineer since his recent elevation to vice president in charge of engineering for all I-T-E divisions. Mr. May formerly was with the Westinghouse Electric Corp. and the Wright's Automatic Machinery Co. and since 1948 has been chief mechanical engineer of the Deering Milliken Research Trust, Pendleton, S. C.

Link Belt Co., Chicago, has appointed Ralph W. Rausch consulting engineer, with headquarters at the Pershing Road plant, Chicago, of which he has been chief engineer since 1947. Joseph J. Richard, formerly executive assistant chief engineer of the plant, has been appointed chief engineer to succeed Mr. Rausch. Robert W. Suman has been appointed chief engineer of the company's Phila-

COAL MEN ON THE JOB



RED JACKET COAL CORP., Red Jacket, W. Va.—Among the supervisory officials enjoying the 5th ennual Labor-Management Safety Dinner were: (I to r around table): Otto Craven, D. W. Halstead, Ray Woodward, Joe Gillespie; E. F. Smith, D. L. Hagan, J. F. Maurice, J. H. Turner, Julius Howell, J. A. Damron, G. F. Davis, Ty Hammond, Charles Millam, Mike Ferrell, C. H. Williams, Tony Webb, E. S. Burleson and E. S. Ferrell.



THE NEW RIVER CO., Mt. Hope, W. Va.; C. C. Ballard, (left), master mechanic; John C. Scott, properation superintendent; and S. D. Olwin, assistant engineer, tipples and equipment.



WINISLE COAL CORP., Chapmanville, W. Va.: I. R. Repass Sr. (left), office manager; Lester Taylor, tipple foreman; and Thomas E. Davis, mine superintendent,



The "BOOKLET-OF-THE-MONTH" for every industry that uses petroleum products

Here is a practical cooperative plan that can help you cut controllable costs and offset higher non-controllables. From this single source you can get effective assistance on any problem that involves a petroleum product—any type of petroleum product.

Gulf Periodic Consultation Service makes available to you the regular counsel of one or more trained engineers, backed up by technologists who are skilled in every phase of petroleum science and who have years of experience with practically every type of industrial process and equipment.

This knowledge and experience can be applied profitably to your operating and maintenance problems. In your continuing efforts to increase manufacturing efficiency and profits, here is an important and definite step you can take—at once. Send for your free copy of the booklet which explains this cost-cutting service.



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Name				
Compan	·····	*******************		*************
MATERIAL STATE OF THE STATE OF				

"I WISH THERE WAS A GOOD SUBSTITUTE FOR THE TYPE OF STEEL I'M LOOKING FOR."





ITED STATES STEEL SUPPLY COMPANY



BALTIMORE . BOSTON . CHICAGO . CLEVELAND LOS ANGELES - ME WALKEE - MOUNE, ELL - NEWARK - PITTSBURCH - POETLAND, ORE. SAN PRANCISCO - SEATTLE - ST. LOUIS - TWIN CITY (ST. PAUL) Offices: INDIANAPOLIS - KANSAS CITY, MO. - PHILADELPHIA - ROCKPORD, ILL. TOLEDO - TULSA - YOUNGSTOWN
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UNITED STATES STEEL

MEETINGS

- . BIG SANDY ELKHORN COAL OPERATORS' ASSOCIATION: annual meeting, June 22, Lexington, Ky.
- · CENTRAL APPALACHIAN SEC-TION, AIME: June 18-16, Middlesbaro. Ky.
- . STOKER MANUFACTURERS' ASSOCIATION: annual meeting, June 25-26, South Shore Inn. Lake Wawasee, Syrecuse, Ind.
- . MINING SOCIETY OF NOVA SCOTIA: annual meeting, July 12-14. Sydney, N. S., Canada.
- . OPEN PIT MINING ASSOCI-ATION, ELECTRICAL DIV.: annual meeting, University of Illinois, Union Bldg., Urbana, III., July 27.

delphia plant. He has been chief engineer for power transmission products since 1946 and is now assuming the added responsibility of materialshandling-equipment engineering, succeeding William S. Campbell, who has retired from active duty.

R. K. Gottshall, assistant to the president, has been elected a vice president of Atlas Powder Co., Wilmington, Del. Well known in the explosives industry, Mr. Gottshall joined the company in 1927, becoming director of explosives sales in 1943 and assistant general manager of the explozives department in 1948.

L. A. Green, president and general manager, The Industrial Equipment Corp., Pittsburgh, Pa., this year marks his 50th anniversary in the equipment business. The company represents leading manufacturers, specializing in equipment for mines, mills and contractors. It also maintains shops and storage yard in Carnegie, Pa., where used equipment accepted in trade generally is rebuilt.

National Malleable & Steel Castings Co. has named Mark M. Miller sales manager of its Indianapolis plant, succeeding A. L. McColloum, who is retiring after over 30 yr with the company. John H. Murphy, who has been in the sales department since his return from military service, has been made assistant sales manager to succeed Mr. Miller.

George W. Marshall Jr. and Alvin F. Heinsohn have been elected vice presidents of Raybestos-Manhattan, Inc., Passaic, N.J. Mr. Marshall, who has been sales manager of the company's Asbestos Products Div. since 1947, will continue to direct sales activities on asbestos products. Mr. Heinsohn will be vice president in charge of the company's General Asbestos & Rubber Div. at North Charleston, S.C. He has been general manager of the North Charleston

MARION WALKING ECONOMY CAPACITY RANGE

Dragline is steadily winning favor in coal throughout the world. Its size, range and ability to travel easily over rough and soft ground are a few of many reasons for its growing popularity.

same advantages in a larger machine for projects where the yardage to be moved requires additional bucket capacity. Either machine can be diesel or Ward-Leonard electric, depending on your preference. (For the biggest jobs, you may want to know also about the MARION 7800—a 30 cu. yd. walking dragline.) Get the full story on these machines from your nearest MARION sales office or write to us at Marion, Ohio.



PROVED IN PERFORMANCE

Grinnell-Saunders Valves with
CHEMICALLY INERT
KEL-F*
DIAPHRAGMS

Grinnell-Saunders Diaphragm Valves with KEL-F Diaphragms are living up to every promise made for them! At the right are reports from tyoical users.

KEL-F's resistance to chemical action, low cold flow, wide range of temperature application and exceptional flex life combine to make it the most important diaphragm development in years. KEL-F is chemically inert to all organic acids and alkalies in all concentrations. It withstands chlorinated aliphatic and aromatic compounds, concentrated nitric, chromic, hydrofluoric and sulphuric acids and most solvents which readily attack rubber and previous synthetic diaphragm materials.

While KEL-F is tough and flexible, it is not resilient. To provide resiliency for proper closure of the valve and to provide added support for the KEL-F diaphragm, it is backed with a rubber cushion. A free-floating method of attachment to the compressor assures an even closing pressure on the entire surface of the weir. A tube nut which floats as the rubber cushion presses down in closing the valve, eliminates excessive pressure on the diaphragm stud. The rubber cushions the closing force, thereby reducing wear and cutting action on the diaphragm. In accelerated tests, a 2-inch valve with a KEL-F diaphragm withstood over 80,000 closures, drop tight, against 80 pounds of air under water with no leakage and no visible signs of wear. Write for complete information.

Typical performance reports . . .

- Chlorine and HCl gas with small emounts of acetic acid and acetyl chloride at 302° F. for 900 hours. Very much superior to material it replaced.
- Mixed aromatic and ketone solvents at 230° F. and 10 psi for three months. No sign of deterioration.
- Chlorinated organic chemical at 158 to 194° P. and 30 to 40 psi for nine months. No failure, no shutdown, no replacement.
- Chromyl chloride at ambient temperature and 15 psi. Diaphragm condition good at end of thirty days' test.
- Liquid chloral saturated with HCl at 158° F. for 408 hours. Well satisfied — have placed orders for additional diaphragms.

"'KEL-P" is the registered trade name for polytrifluorechlorethylene, on exceptionally stable thermoplastic. It is produced by the M. W. Kellogg Co.

GRINNELL

WHENEVER PIPING IS INVOLVED



GRINNELL COMPANY, INC., Providence, R. I. Warehouses: Atlanta • Billings • Buffalo • Chorlette • Chicage
Claveland • Cranston • Fresno • Kansas City • Houston • Long Beach • Los Angeles • Milwaukee • Minneapolis • New York
Oakland • Philadelphia • Pocatello • Sacromento • St. Lauis • St. Paul • San Francisco • Seattle • Spokene

EQUIPMENT APPROVALS

Three approvals of permissible equipment were issued by the U. S. Bureau of Mines in April, as follows: Lee-Norse Co.—Type CM46-1 Koal-Master; one 15-hp and two 50-hp motors, 230 v. DC; Approval 2-783; April 10.

Joy Mfg. Co.—Type T2A-6APE/F mining machine truck; two 4-hp and one special real motor, 250 and 500 v, DC; Approvals 2-784 and 2-784A; April 13.

Joy Mfg. Co.—Type DM cable splice box: DC; Approval 2-785; April 24.

plant since 1944. Raybestos-Manhattan also recently announced plans to erect a new plant in Crawfordsville, Ind., to be named the Wabash Div.

S. Vernon Travis has been appointed assistant general sales manager of General Electric's Large Apparatus Div. at Schenectady, N.Y. He has been succeeded in his former position as manager of sales for the company's Large Motor and Generator Div. by Louis H. Matthes, formerly assistant manager of sales.

John A. Roebling's Sons Co., Trenton, NJ., has appointed Walter Whiting Chicago district manager in its electrical wire division. Mr. Whiting joined Roebling in 1929 and since 1935 has been a salesman in the Oregon territory.

John F. Scott has been appointed tubular-products division manager of the general sales department, U.S. Steel Supply Co., Chicago.

The Huber Mfg. Co., Marion, Ohio, has named Western Machinery & Engine Co. distributor for its complete line of road-building and maintenance equipment in eastern Missouri and central and southern Illinois. In addition to its main office in St. Louis, the company maintains a branch office in Centralia, Ill. Officials include Hugh Scott Sr., president; Gilbert A. Weidlich, vice president; and Gilbert J. Nichols, secretary and general manager.

Caterpillar Tractor Co., Peoria, Ill., has promoted M. H. Hulings to assistant district representative, contacting Caterpillar distributors in North and South Dakota and the Saskatchewan Province.

Kennametal, Inc., Latrobe, Pa., has acquired through a stock transaction the Nevada Scheelite Co., a tungsten producer with mines and a mill near Rawhide, Nev. According to Philip M. McKenna, president, steps to improve the output of this tungsten property include exploration by core drilling and installation of additional grinding and flotation facilities in the mill. The transfer of F. O. Hill, application engineer, from Cincinnati to its district



FOR Safeotinstallation of ROOF BOLTS



DUFF-NORTON

Mine Roof

JACKS

Don't take chances! Be assured of maximum safety with Duff-Norton mine roof jacks as temporary supports, when installing split rods, expansion bolts and all other type suspension supports in your mine. For complete data on mine roof and other Duff-Norton Mine Jacks...

See your local distributor or write for the "Handy Guide for Selecting Duff-Norton Mine Jacks."

THE DUFF-NORTON MANUFACTURING CO.

WOIN PLANT LINERAL OFFICES PILISBURCH IN PA CANADIAN PLANT TORONTO & ON

The House that hacks Kuilt

office in Cleveland also has been announced by the company.

International Harvester Co. has announced plans for the construction of a new building to house a service parts depot and a general sales district office and warehouse in Denver. Colo. The building, which will cost approximately \$1,500,000, will be a one-story structure with some 181,000 sq ft of floor space. Planned as an entirely new Harvester facility in Denver, the depot will be one of 11 other depots the company has established throughout the U.S. It will serve as a wholesale distribution center for service parts for all Harvester products. servicing all Harvester dealers and company operations in the states of Colorado and Wyoming and parts of Utah, Arizona and New Mexico.

Plans for a new building for its enginerring department have been announced by The Electric Storage Battery Co. as part of the \$5,000,000 construction program now under way at its Crescentville plant in Philadelphia. The three-story building will provide 40,000 sq ft of working area and is expected will take care of future needs of the company's continually expanding design, research and development program.

Completion of a new "designed-forresearch" building, to be devoted exclusively to building and testing experimental transmissions, has been announced by the Transmission Div., Fuller Mfg. Co., Kalamazoo, Mich. The new 5,000-sq ft building almost doubles the space available for research activities at Fuller, according to T. Backus, vice president in charge of engineering, and is the second "specialized" building completed recently. A 12,500-sq ft service-parts building was opened a few months ago. Completion of these buildings is part of an over-all expansion program to increase production facilities.

Merger of two Cummins sales and service organizations with the Cummins Diesel Sales Corp. and the appointment of a general manager have been announced by Cummins Engine Co., Inc., Columbus, Ind. William B. Lawrence, Cummins manager for the Rocky Mountain region since 1948, has been named general manager of the sales corporation. Subsidiaries affected by the merger are Cummins Diesel Sales Corp. of Illinois and Cummins Diesel Sales & Service of New York, Inc. Charles C. Sons has been appointed acting eastern service manager, for Cummins Engine Co., Inc., with headquarters in Columbus. Dillard B. Davis, formerly eastern service manager, now is regional service representative in the central region, with headquarters in Chicago, replacing Lloyd Kerber, who recently resigned to become general service manager for Cummins Diesel Sales Corp. of Missouri.

Du Pont's new Experimental Sta-

STOODY AAAAA

years of proof

lyears of proof

on automatic
hard-facing of
tractor rollers

and idlers.

STOODY 105 was the first hard-facing alloy developed for application on tractor parts by the automatic welding process. Its value in increasing equipment life is now proved by four years actual use in the field. Stoody 105 possesses an alloy content which insures true hard-facing properties, longer wear! Because of its low cost and speed of application, coupled with uniformity and excellent wear resistance, STOODY 105 is the accepted standard wherever automatic hard-facing is utilized. Try Stoody 105 yourself. Shops equipped to rebuild tractor parts by the automatic process are now located in most areas. Names will be provided upon request or your Stoody dealer will be glad to refer you to your nearest source.

STOODY COMPANY

11943 East Slauson Avenue, Whittier, California

The New Continuous Haulage System

LONG PIGGYBACK MINING * FOLLOWS THE LOADING

CENTERS LOAD

FREES THE LOADER OPERATOR TO DEVOTE HIS WHOLE ATTENTION FORWARD, TO ACTUALLY LOAD COAL CONTINUOUSLY

YOUR PRESENT LOADER CAN BE USED

LONG conversion beam for loader lifts and carries receiving end of Piggyback. Loader supplies all movement

One man, with his helper, operates the loader - Piggyback - room conveyor combination as one machine. He devotes his full attention to keeping the loader in coal—loading continuously. He never has to look back to see if his receiving medium is in place—never has to reposition his rear conveyor—never has to tram coal on the loader—never has to stor for pan ups during the loading cycle. No one else so much as pushes a button as the coal moves continuously out of the room.

Standard caterpillar - mounted loading machines are all adaptable to the Piggyback system. All that is required is a simple conversion consisting of removing the conventional swinging boom and replacing it with a short, straight unit designed by LONG for use with the Piggyback. The one loading machine may load in two or more faces with room conveyor and Piggyback in each room.

Conversion to the Piggyback system is therefore possible with less cost and with far greater advantages to be gained than with any other mine modernization plan. exclusive of construction costs, to support its research activities.

Preparation Facilities

tion addition in Wilmington-"a \$30,-000,000 investment in research as a

way to economic progress"— was dedicated last month at ceremonies attended by some 200 distinguished aca-

demic and industrial scientists. Located on a 57-acre tract adjacent to the original station, which was estab-

lished in 1903, the new facilities include 19 new buildings, including nine laboratory buildings and 10 service

buildings. Two of the laboratory build-

ings in the older area were substantially enlarged as part of the project. The Station now has about

800 technically-trained research workers representing a wide range of sciences, and in addition, has approximately 1,500 non-technical employees.

Du Pont in 1950 spent \$38,000,000

Princess Dorothy Coal Co., Robin Hood, W. Va.—Contract closed (with Kanawha Mfg. Co.) by Jeffrey Mfg. Co. for one 2-compartment diaphragm jig; capacity, 300 tph, 5x¾-in coal.

South-East Coal Co., Paintsville, Ky.

—Contract closed with Jeffrey Mfg.
Co. for one 2-compartment diaphragm
jig; capacity, 300 tph, 8x ¼-in coal.

Swatara Coal Co., Minersville, Pa.— Contract closed with Wilmot Engineering Co. for one 9-ft-diameter Wilmot froth-flotation unit to prepare minus %i-in to plus 100-mesh anthracite; feed capacity, 30 tph.

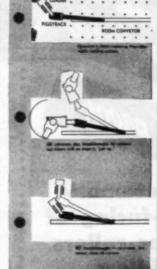
John Reber, Bowmanstown, Pa.— Shipment by Deister Concentrator Co. of one SuperDuty Diagonal-Deck No. 7 coal-washing table for cleaning no. 1 buck.

Guyan River Co., Midkiff, W. Va.— Shipment by Deister Concentrator Co. of one SuperDuty Diagonal-Deck No. 7 coal-washing table for ½x0 fraction of river-dredged coal.

International Machinery Co., Rio de Janeiro, Brazil—Shipment by Deister Concentrator Co. of one SuperDuty Diagonal-Deek No. 7 coal-washing table for cleaning %x0.

Association Activities

Exra Van Horn was re-elected executive vice president of the Ohio Coal Association, his 19th consecutive year in that position, at the association's annual meeting in Cleveland April 16. Other Officers elected were: E. H. Davis, president; W. D. Hamilton, vice president; E. H. Miller, secretarytreasurer; Anna Lucht, assistant secretary-treasurer; Ford Sampson, labor commissioner; and E. W. Lewis, assistant labor commissioner. Named directors of the association were: P.



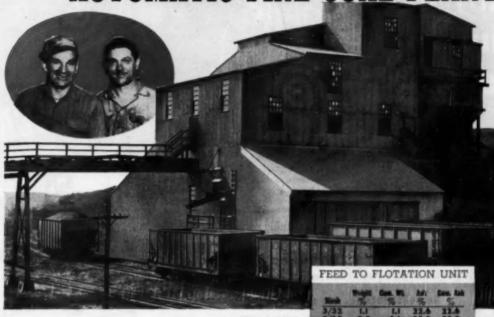
LONG

SUPER MINE CAR CO., INC.

PAYETTEVILLE . WEST VIRGINIA

Chain Conveyors and Conveyor Equipment for modern mining

2 MEN OPERATE THIS NEW AUTOMATIC FINE COAL PLANT



Two Wilmot Hydrotators and One Wilmot Froth-Flotation Unit Equip This 500-Ton Capacity Plant

Representing one of the nearest approaches to push-button coal preparation, this new fine coal plant of The Rhoads Contracting Co. at Park Place, Pa., is being operated two shifts a day by two men per shift. In addition to two Wilmot Hydrotators for Barley and No. 4 coal, a Wilmot Froth-flotation unit recovers everything else down to 100 mesh.

Records of Wilmot frothflotation units at the Rhoads and other plants show: 1) 35% increase in yield of marketable fines; 2) reagent cost of IMC per ton of clean coal against a normal 6Mc; 3) oil-free

Actual Operating Results of the Wilmot Freth Flotation Unit in Above Plant

product; 4) lower labor and maintenance costs. Four models for all sizes of plants.

CLEAN /5 COAL

New York	1000	0.10 SW	1000 K K K	
3/64	1.8	1.8	6.1	6.1
1/32	11.0	24.8	7.4	7.3
38	31.2	36.0	9.0	8.2
48	23.A	79.4	10.3	8.8
171 45	12.9	92.5	12.9	9.4
100	4.2	96.3	18.5	9.8
200	1.8	98.3	17.3	9.9

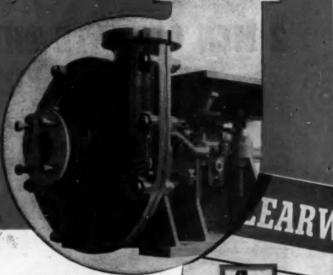
REFUSE

0 64	0.6	65.9	45.9
0.9		72.9	70.7
0 2.3	3.4	80.8	76.8
8 10.4			
8 13.4			
3 21.1	49.1	69.2	
4 22.4			
14 14	100.0	1.304	JAT
		and the same	THE REAL PROPERTY.
	0 0.4 0 2.3 8 10.4 8 13.4 8 21.1 2 25.4 4 22.4	0 0.9 1.1 0 2.3 3.4 8 10.8 12.6 13.4 28.6 9 21.1 49.1 1 25.0 74.0 4 22.6 97.3	0 0.9 1.5 72.0 0 2.3 3.8 80.8 8 10.8 14.6 92.7 9 13.4 28.0 79.4 9 21.1 49.1 69.2 2 24.8 74.0 47.3 4 22.6 97.8 38.2

WILMOT ENGINEERING CO.

HAZLETON, PA

This new size may fit your "in-between" pumping need



heed a pump with maximum performance in the 75 to 300 G.P.M. range, with heads up to 70 feet? Our new AB-Frame Hydroseal may be just the thing you've been looking for . . . Using a three-inch suction and discharge, it has the same million-ton-plus endurance and maintained efficiency of the rest of the Hydroseal line—the pumps that mill engineers swear by—not at!

No substitute for the right size

If you've ever tried to break in a new pair of shoes that didn't fit, you know how important it is to get the proper size. Pumps don't develop corns, of course, but they can cost you plenty in down-time, excessive wear, and power if they can't do their job efficiently.

You can be sure of getting a cus-

tom-built solids-handling pump at ready-made prices if you specify Hydroseals, regardless of your head capacity requirements. From slurries to six-inch boulders, there's a Hydroseal that's made to fit the job. Let us tell you more about this complete line of solids-handling pumps... Write or use the coupon,

THE ALLEN-SHERMAN-HOFF PUMP CO.

Offices and Representatives in Principal Cities

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he Allen-Sherman-Heff Pump Co. 201 South 15th St., Philadelphia 2, Pennsylvania lense send me a copy of your new Hydroseal Pump Canalog No. 451.

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A handbook on efficient materials pumping

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HYDROSEAL

SAND, SLURRY & DREDGE PUMPS
MAXIMIX RUBBER PROTECTED

AND MAXIMUM DESCRIPTION AND COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD

C. Beutel, E. H. Davis, W. D. Hamilton, R. L. Ireland Jr., Stanley B. Johnson, George M. Jones Jr., E. F. Maurer, Harold E. Turner and Whitney Warner Jr.

Fuels Research Council, Inc., Washington, D.C., elected the following officers at its annual meeting last month: president, F. A. Fontyn, president, Ebensburg Coal Co.; vice president, Charles A. Owen, chairman of the board, Imperial Coal Corp.; treasurer, M. R. Grover, vice president, Anthracite Institute; and general counsel, Tom J. McGrath. Robert E. Lee Hall, NCA counsel, was named secretary to succeed James W. Haley, who resigned because of demands of other business. Council directors, in addition to Messrs. Fontyn and Owen, are: F. W. Earnest Jr., president, Anthracite Institute; E. J. Kerr, manager of technical services, B. & O. R.R.; J. H. Nuelle, president, D. & H. R.R.; D. I. Mackie, general counsel, D., L. & W. R.R.; H. W. Large, general coal traffic manager, Pennsylvania R.R.; and M. J. Alger, vice president, New York Central System.

Obituaries . . . from p 164

for several years though he had continued to maintain his many company and industry activities. One of the outstanding leaders of the anthracite industry, Mr. Taggart was directly responsible for the formation of the Anthracite Emergency Committee in 1939, was active in the establishment of the Anthracite Institute and had long been prominent in other industry affairs. For some years he had been a member of the Anthracite Operators' Wage Negotiating Committee and since 1947 had been chairman and chief spokesman for that group.

From his graduation from Phillips Andover Academy in 1906 until 1935, Mr. Taggart was continuously employed in various supervisory and official positions by The Virginia Coal & Iron Co., Stonega Coke & Coal Co. and their affiliated and associated companies. In 1929, as vice president in charge of operations of Stonega Coke & Coal Co., he moved from southwest Virginia to the Philadelphia offices and assumed the additional duties of vice president in charge of operations of the Westmoreland Coal Co. He also served as an official and director of the various affiliated companies. Mr. Taggart became president of P. & R. in October, 1935, and had been chief executive officer for the company and its affiliated and associated organizations since that date.

Joseph Pursglove, Sr., 73, formerly one of the leading bituminous producers in West Virginia and Ohio, died April 24 in Lakewood Hospital, Cleveland. Born in England, Mr. Pursglove was brought to this country as a child and began work as a trapper in Pennsylvania mines at the age of 14. At



VICTAULIC COMPANY OF AMERICA

1100 Mouris Avenue, Union, N. J. Mailing Address: Box 509, Elizabeth, N. J. Phone: Elizabeth 2-3640 Victaulic Inc., 727 W. 7th St., Los Angeles 14, Calif.

Victaulic Inc., 727 W. 7th St., Los Angeles 14, Calif. Victaulic Company of Canada, Ltd., 406 Hopewell Ave., Toronto 10 For Export outside U. S. & Canada: PIPECO Couplings & Fittings., Pipe Couplings, Inc., 30 Rockefeller Plaza, New York 20, N.Y.

27TH VICTAULIC YEAR



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SuperOuty "Most Trouble-Free Equipment in Plant"

Super Duty Diagonal Deck Coal Washing Tables were described recently by the Superintendent of a well-known coal company not only as the "most trouble-free equipment" in the plant, but as doing a "better cleaning job than the air boxes or jig."

The Superintendent further reported that the equipmen is recovering over 12 tons per hour of coal that was formerly wasted.

Such reports from the field but add to the overwhelming evidence of *Diagonal Deck* superiority, not only over other types of tables, but over other kinds of equipment in cleaning the fine sizes of coal.

For full information about these modern profitproducers, ask for Bulletin 119.

FOR SCREENING ECONOMY

The Leaby Vibrating Screen possesses an uncanny ability to do a job right—and in record time. It screens wet or dry, using screen cloth or perforated plate. Exce'lent for fine mesh screening, dewatering or desanding. Range from finest mesh up to 2°. Ask for Bu letin 14-H



* The ORIGINAL Deister Company * Inc. 1906

the turn of the century, Mr. Pursglove and three brothers established the Pursglove Coal Mining Co., operating out of Pursglove, W. Va., which he headed as president. The company was sold to the Pittaburgh Consolidation Coal Co. in 1943 and in recent years Mr. Pursglove had been active as a coal distributor in Cleveland. His son, Joseph, Jr., is vice president in charge of research for Pittaburgh Consolidation.

John Hill, 65, assistant safety director, Consolidation Coal Co. (Ky.), Div. of Pittsburgh Consolidation Coal Co., died suddenly April 19 at his home in Jenkins, Ky. Long active in safety work, Mr. Hill had been employed by the company for 40 yr.

John Boylan, 58, secretary of the Anthracite Conciliation Board since 1935, died May 2 in Mercy Hospital, Scranton, Pa. Mr. Boylan had been a patient in the hospital for 6 wk and had undergone two operations. He was widely known throughout the industry for his work with the board and formerly was president of UMWA District 1.

Charles C. Hagenbuch, 63, engineering assistant to the president of the Hanna Coal Co. Div. of the Pittsburgh Consolidation Coal Co., St. Clairsville, Ohio, died May 4 in the Ohio Valley General Hospital: Mr. Hagenbuch suffered a heart attack the previous Monday and failed to recover.

Defense Developments

DSFA Readies Transport Curbs

DSFA Order SFO-2, effective April 30, sets up machinery for clamping controls on individual shipments of solid fuels when and if controls are needed. Under the order, DSFA may issue directives requiring or forbidding specified shipments or deliveries and shippers and receivers must maintain records of controlled shipments for 2 yr.

Armed Forces to Release Some Reservists

The Department of Defense recently announced plans to release certain reservists. In general, the plans now are as follows:

Army—In September, will begin releasing enlisted reservists ordered to duty as individuals from a non-pay status. Pace of the releases will be determined by developments in Korea and elsewhere. The Army will cancel orders of enlisted reservists of inactive and volunteer groups who were granted delays and have not yet re-

What does U.S. Rubber's pinch valve do for the coal industry?



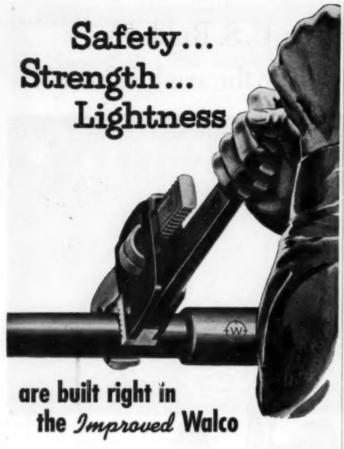
The new "U.S." pinch valve outwears metal when installed in pipe lines carrying abrasive or corrosive mixtures. Its flexibility offsets misalignment in pipes, absorbs vibration, breaks up galvanic action in pipes, eliminates "water hammer" and offers a positive seal in a closed position. The metal parts of the valve can be refitted to new valve bodies, thereby reducing replacement costs.

These valves are also available in neoprene for oil resistance, butyl rubber for high heat and severe acid conditions, and pure gum stock for food and beverage conveyance. Extremely compact design. Write to address below.

ber pinch valves controlling the flow of water containing abrasives in a Pennsylvania coal preparation plant. Many of them have been in continuous operation for over 16 years. Below the photo is the newest of the U.S. family of pinch valves, shown in a closed position. Sizes range from 11/2 inches to 8 inches.



STATES RUBBER



Walco, the strongest pipe wrench on the market today, is also the safest - and lightest all-steel wrench available. Why? Because welding - with all its inherent strength, safety and weight-reduction advantages - has been used to join the Improved Walco's housing and handle into one integral unit . . . a unit that makes the Walco so rugged that all tests show it far exceeds the requirements set up by Federal Specification GGG-651a for Type II Heavy Duty Adjustable Pipe Wrenches.

The jaws of the Improved Walco are carefully machined and will not slip; even severe abuse will not spoil the wrench's grip or quick biting action. A flexible, double-acting, quickly replaceable spring - an Improved Walco feature for which patent is pending - gives the wrench fast, positive ratcheting action. Adjustment is easy - the nut may be spun with the palm of the hand. The proper wrench opening can be determined by a calibrated pipe scale on

the movable jaw.

Ask your Walworth Distributor to show you the Improved Walco the strongest-made and longestlived pipe wrench on the market today. Buy it - you will save money

in the long run.

ALWORT

valves • fittings • pipe wrenches 60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD directs coal and coke producers to file

ported. This will not apply to Active Reserve or National Guard.

Navy-In July, will start releasing enlisted reservists called up from a non-pay drill status. The first release will turn loose about 1,000 men. By October, the rate will be 6,000 monthly, two-thirds of whom will be Volunteer Reservists. A release program for reserve officers will not go into effect before April, 1952.

Air Force-Airmen ordered up from Volunteer Reserve may ask for release after 12 mo of service. Reserve officers called up from Volunteer Reserve since June 25, 1950, must serve 21 mo. Air National Guard and Organized Reserve airmen may be released after 21 mo or at the end of their enlistment plus 1-yr extension.

Marine Corps-Plans to release nearly all reservists who so desire by June 30, 1952, except that second lieu-tenants and non-veteran officers will be retained for 21 mo.

On the whole, veterans of World War II will get priority of release in all four services. All plans, of course, are contingent upon military needs and developments.

Earlier, in April, the four services announced that few inactive reservists (men not in drill-pay status) will be called up.

CMP Needs No Action By Coal Men-Yet

The new Controlled Materials Plan. scheduled to go into effect July 1, covering steel, copper and aluminum, thus far is directed only at producers of those metals and at manufacturers. As users of these manufactured products, coal companies are not affected by the regulations—yet. Coal men seeking copper, steel and aluminum will use the same procedures as heretofore, until CMP regulations are changed.

ESA Gives Yardstick for Price-Rise Appeals

The Economic Stabilization Administration has set up informal standards for determining whether price ceilings for an industry should be raised. Ceilings will be considered "generally fair and equitable" if an industry's dollar profits amount to 85% of the average for that industry's best 3-yr period during the 4 yr, 1946-49. If an industry's profits fall below this standard, adjustments will be considered. Adjustments, or refusals to adjust, will apply to an entire industry, whatever the profits status of any individual company.

Coal, Coke Facilities To Be Classified

DSFA order SFO-1, issued April 20,

This Department Is Never Busy

but Seco VIBRATING SCREENS ARE!



Long Life PERFORMANCE means PROFITABLE SCREENING for SECOusers

If you have Seco vibrating screens on your job . . . it's good to know that you can get quick service on any parts replacements you may ever require. That's part of Seco's service policy ... another of the reasons why you put your confidence in the Seco organization.

BUT HERE'S SOMETHING MORE IMPORTANT!

Seco vibrating screens are built to endure. The smooth, balanced performance of patented Seco vibrating screens pays off in long life . . . and a holiday from excessive maintenance worries. It's a proven fact! Thousands of busy Seco vibrating screens can't keep our parts department busy.

VIBRATING SCREENS

WHAT'S AHEAD? Check your screening requirements now PLAY SAFE! REPLACE OR ENLARGE WITH

Performance-Proven SECO VIBRATING SCREENS

made only by SCREEN EQUIPMENT CO., INC.

1750 Walden Avenue Buffalo 25, New York in Canada: United Steel Cor Toronto, Ontario



SINGLE



DOUBLE DECK



TRIPLE DECK



THREE AND ONE HALF DECK

Longer Hours of... CONTINUOUS SERVICE



MORRIS TYPE R SLURRY PUMP

The 4 features of the Morris Type R Slurry Pump mean low-cost operation...minimum "lay up" time.

 Easily dismantled — Impeller and shaft sleeve are renewable without disturbing piping or bearings.

Four easy-to-get-at outside clamping bolts hold impeller, liner, shell and cover firmly in place.

Simpler design—The Morris Type R Slurry Pump has no troublesome internal boits or studs.

Gland is under suction pressure only. Hence, it's less vulnerable to abrasive solids . . . less subject to packing troubles.

Four adjusting screws close the worn clearances on the suction side of impeller. This adjustment moves the entire rotating assembly as a unit.

- Ocrosion-obrasion resistant—You may have the Morris Type
 R with its moving parts in any of various metal alloys, depending upon
 the kind of slurry you handle. Parts are quickly interchanged.
- Shell is interchangeable for right or left-hand rotation— Permits 72 different combinations of suction and discharge nozzles.
- FREE TECHNICAL SERVICE—Morris Engineers have been building pumps for more than 80 years. They will be glad to recommend the pump best suited to your needs. No charge or obligation.

FOR LESS TROUBLE ...

LESS MAINTENANCE ...

LESS LAY-UP TIME ...

and LONGER HOURS OF CONTINUOUS OPERATION

Specify
MORRIS TYPE R
SLURRY PUMP

MORRIS MACHINE WORKS

Baldwinsville, N. Y. Branch Offices in Principal Cities



a report with DSFA by May 15, 1951, on each facility they operate. The reports will help DSFA classify mines and plants for government aid in the defense program, especially in obtaining materials and supplies. Form DSFA-1, used for making the report, may be obtained from Defense Solid Fuels Administration, Department of the Interior, Washington 25, D. C.

Mining-Machine Controls Returned to Commerce Dept.

Authority governing the manufacture and distribution of mining machinery and equipment, formerly assigned to the Secretary of the Interior, has been transferred to the Secretary of Commerce. The transfer agreement directs that NPA will set up a separate mining-machinery and equipment division within the Industrial & Agricultural Equipment Bureau. This division will be responsible for correlating the programs of DSFA and Defense Minerals Administration. Coal men in need of machines or equipment will continue to apply through DSFA.

NPA Limits Use Of DO-97 Rating

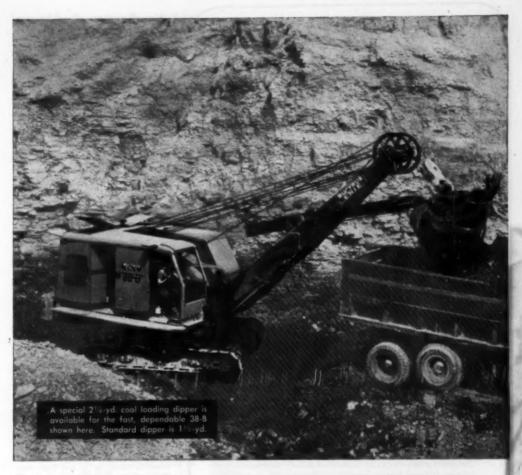
Rails, tie plates, track spikes, splice bars, rail joints, frogs, switches, rubber tires and tubes, as well as some other items, may not carry a DO-97 priority, according to NPA Regulation 4, effective April 16. If DO-97 was used on orders for these materials prior to April 16, it was automatically cancelled. The regulation did not cancel the orders or change MRO quotas in any way.

DO-97 still may be used for MRO materials other than those included in NPA Regulation 4.

House Group Votes to Double Depletion Rate

The House Ways and Means Committee voted tentatively May 3 to raise the depletion allowance for coal to 10% of gross income, provided, however, this does not exceed 50% of net income. The committee's action, if later confirmed by the group and passed on through the usual legislative channels, would double the present depletion rate and climax a long drive by coal operators for fairer tax treatment.

Taxing authorities at first had recommended that depletion rates for oil and natural gas be cut from $27\frac{1}{2}\%$ to 15% and that the rate on coal be unchanged. Following this, it was proposed that the base for oil and gas be 15%, with allowance up to $27\frac{1}{2}\%$ if that much actually was spent for exploration and development. The committee's action May 3, however, left the rate for oil and gas at $27\frac{1}{2}\%$.



Stand-Out On the Coal Seam

BECAUSE they load fast and load big ... because they stay on the job year after year for dependable output ... because they're easy on the operator and low on operating and maintenance costs — these are some of the reasons why Bucyrus-Eries are such outstanding performers on coal seams all over the nation. Experienced Bucyrus-Erie design provides the balanced speeds and power that mean a fast, smooth cycle. Careful laboratory control of materials puts strength and durability into every

part. Simple, easily accessible machinery means less time out for servicing and maintenance. Your Bucyrus-Erie distributor has full information on %- to 4-yard gasoline, diesel and single-motor electric excavators. See him for complete details.



SOUTH MILWAUKEE, WISCONSIN

229890

What's the "RETIREMENT AGE"? "RETIREMENT buildings? for your buildings."



Not all structures have to be "retired" just because conditions change. Standard Armco STEELOX Buildings can be quickly and economically moved or altered whenever necessary.

The entire structure can be dismantled and re-erected on a new foundation without loss of material or efficiency. Or, just loosening a few bolts permits moving doors, windows and partitions. Your building can be extended with standard parts that are always obtainable.

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Choose Armco STEELOX Buildings for head houses, cap storage, utility buildings and other mining needs. Write for data. Armco Drainage & Metal Products, Inc., 3431 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

ARMCO STEELOX BUILDINGS



New Keystone Coal Buyers' Manual Soon Off Press

A 35% change in listings of personnel and operating mines against last year's edition features the 1951 edition of Keystone Coal Buyere Manual, a Coal Age affiliate. The new edition comes off the press in June.

A study of data in the new Keystone indicates that over 200,000,000 tons of the 1951 coal production will come from new mines opened since the end of World War II, J. R. Forsythe, manager, reports. The 1951 edition enlarges and improves the publication's regular service sections on coal-sales organizations, trade names, seam characteristics, coke plants, cleaning plants and mines. In addition to its comprehensive listings of personnel, equipment and production of all mines producing over 100 tpd, the new volume presents special sections on retailing, coal storage, coal analysis and exports. The indices introduced in this edition are designed for quick location of information.

The 1951 edition is available at \$20 per copy from Keystone Coal Buyers Manual, 330 West 42nd St., New York 18.

Steel Cuts Threaten Natural-Gas Users

Mounting demand for natural gas coupled with inadequate steel to build additional pipelines may create shortages of natural gas in some cities in the coming winter and for some years ahead, according to Bruce K. Brown, deputy administrator, Petroleum Administration for Defense. Mr. Brown sounded his warning May 8 in Dallas,

The supply of steel in the months ahead is likely to be less than two-thirds of the planned needs of the oil and gas industries, and may fall as low as one-half of their needs, he said. The only relief will come from possible cutbacks in less essential needs for steel, increased steel production, and a Controlled Materials Plan.

Meanwhile, in Pittsburgh, The Manufacturers' Light & Heat Co. warned that the city would face another gas shortage next winter, like the one last winter, unless the company is permitted to build 172 mi of pipeline to Clinton County, Pa., where a new gas field has been brought in.

Elsewhere, in Boston, Roderick Stephens, public-relations counsel, New York City, told retail fuel dealers that reliance on natural gas in New England may result in industrial shutdowns whenever peak loads exceed pipeline capacity.

Property values will depreciate wherever transmission lines pass by and present safety regulations covering natural-gas lines are inadequate, Mr. Stephens also warned.

Introducing

'RUFKOTE'

For sealing mine roofs against scaling and spalling during the hot, summer months and for many other uses



lilustrates application of "RUFKOTE" by means of a spray gun.

- "RUFKOTE" is an especially prepared roof coating that seals roofs against scaling and spalling.
- It is prepared for application by means of air spray equipment.
- For over two years actual application in various mines has proved it to be the most effective and economical product of its kind.

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- "RUFKOTE" is ideally suited to the following applications:
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 - To seal cement block stoppings and overcasts
 - To seal temporary brattice cloth stoppings and airways.

"RUFKOTE" can be used on cement block, brick, rock, steel and wood surfaces—does not require a primer coat—will not burn or have injurious effect upon a person's skin—and has no injurious or toxic fumes.

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Shows parallel entry not sprayed with "RUFKOTE". Note amount of fallen reck.



Shows condition of main entry after 16 months service when sprayed with "RUFKOTE".

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News In Brief

Enos Establishes Scholarships

Granting of two annual scholar-ships covering an entire college course, to be known as the George A. Enos Memorial Scholarships in honor of the company's founder, was announced last month by the Enos Coal Mining Co., Indianapolis, Ind. One award. for study at Butler University, Indianapolis, is worth \$700 a year, and the other, for a student attending Purdue University, totals \$500 annually. Two additional scholarships will be added each year so that by 1955 four boys will be attending each university un-der the program. All boys, including sons of company employees, who are in the upper third of their class in high schools in four southern Indiana counties are eligible and recipients are not required to take any particular course of study.

Underground Gas Storage Grows

The Texas Gas Transmission Corp. recently announced the start of con-struction of its Alford underground storage field near Petersburg, Ind., as part of a program that will supplement deliveries of natural gas by 30 million cu ft daily during extreme cold weather. The new field, which will hold 4 billion cu ft, is in addition to the field the company now operates at Oakland, Ind., which has a capacity of 6 billion cu ft. More storage installations are to be announced in the future, the company said. In Illinois, the possibility of similar projects was indicated when the Senate public utilities committee recently overrode coalindustry opposition and recommended passage of a bill to permit development of underground storage facilities for natural gas.

Indiana Award for Little Betty

The Little Betty mine of the Little Betty Mining Co., Linton, Ind., last month was reported winner of the 1950 Templeton Safety Trophy, presented annually by the Indiana Coal Operators' Association in memory of John A. Templeton, pioneer operator in the field. In addition to its no-fatality record, a requirement for the award, Little Betty had only 15 lost-time accidents in mining 550,000 tons. Employees and officials were honored at a dinner, at which Indiana Gov. Henry F. Schricker was scheduled to make the presentation.

Ky. Seniors' Day Draws Crowd

More than 150 high school seniors were guests of the Big Sandy-Elkhorn Coal Mining Institute, in cooperation with the Mayo Vocational School and the Big Sandy-Elkhorn Coal Operators' Association, at the fourth annual "Seniors' Day" held in Jenkins, Ky., May 5. The program included a tour of Mine No. 204, Consolidation Coal Co. (Ky.), Div. of Pittsburgh Consolidation Coal Co., and, as in past years, the boys had ample opportunity to see demonstrations of timbering. loading, cutting, haulage, maintenance work and other phases of mining. The annual event is carefully staged to provide the boys with a comprehensive view of the many worthwhile employment opportunities offered by the coal industry.

Coal Firms Complimented As "Pioneering Employers"

U. S. coal companies received high praise for their part in raising mining efficiency in a report made by coal experts to the International Labor Organization and recently released in Geneva and the U. S. Increasing productivity is "largely due" to the pioneer spirit of coal employers who have given particular attention to improving industrial relations, the report stated. "It would seem quite true to say that the high wage policy of the U. S. is one of the principal reasons for the continually increasing productivity there," it said, and suggested that the II.O coal mines committee



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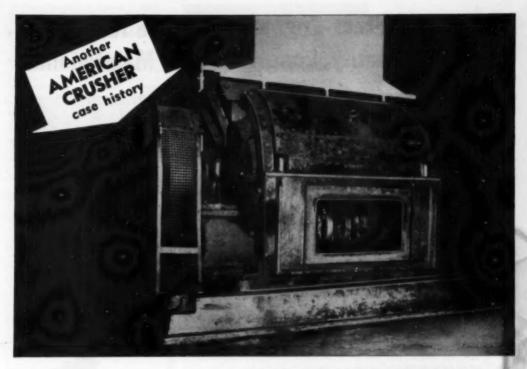
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But here is the eve-opening part of this enviable record: During this entire 20-year period, the total parts replacement cost per ton of coal crushed has been only \$.00025. (In other words, 40 tons for a penny.)

Even more convincing proof of American Crusher quality is the fact that this is typical case history - not an isolated example. An extensive independent survey has revealed over and over again that Americans consistently produce high tonnage for years -at amazingly low parts-cost figures. Discover for yourself why Americans are preferred everywhere for performance, for dependability, and for economy of operation.

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Architect-Engineer's choice for Beauty, Long Life, Low Maintenance



New warehouse - Word Steel Co., North Cambridge, Mass.

When the Ward Steel Company of North Cambridge, Mass, undertook to build the most modern steel warehouse in New England, they called on Waghorne-Brown as designers and engineers. Waghorne-Brown specified rustproof, corrosion-resistant Reynolds Lifetime Aluminum Industrial Corrugated for siding. Their reasons were: appearance, long lite, low initial cost and low maintenance (no painting)...plus great strength combined with light weight that saves money on framing (see specifications).

Aluminum's radiant heat reflectivity was another deciding factor.

On walls or roof, it reduces inside summer temperatures and cuts winter fuel bills. An interesting detail in this building is the contrasting horizontal and vertical application, with aluminum corners and edging. For technical assistance and application details, call any Reynolds Office. Literature on request.

 Offices in principal cities...check your classified phone book for our Building Products listing, or write Reynolds Metals Company, Building Products Division, 2005 South Ninth St., Louisville 1, Ky.

> Aluminum is required for planes and other military needs. Reynolds Lifetime Aluminum Industrial Corrugated is still produced, but the total supply is necessarily reduced, DO-rated orders receive priority handling.



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Lengths 5', 6', 7', 8', 9', 10', 11', 12'

REYNOLDS Lifetime ALUMINUM INDUSTRIAL CORRUGATED

send an international mission to study U. S. mines.

More Diesels to Pennsylvania

The Pennsylvania R.R. will shortly place orders for 132 additional diesel electric locomotives costing some \$45 million, Walter S. Franklin, president, told stockholders at the annual meeting May 8. Without the new units, the Pennsylvania will have 1.036 diesels in service by fall, when diesel-electric or electric locomotives will handle 83% of its passenger service, 76% of its switching and 56% of its freight. he said. The Lehigh Valley R.R. will be 100% dieselized by October, Charles L. Patterson, vice president and general manager, reported May 10.

Canadian Safety Leaders

Top winner of the 1950 John T. Ryan Trophies for Canadian coalmine safety was the Princess colliery of the Old Sydney Collieries, Ltd., Sydney Mines, N. S., which was Dominion winner and leader in the Maritime Provinces in 1949 as well. The Alexo mine of the Alexo Coal Co., Alexo, Alta., had the best record in the Prairie Provinces, and in British Columbia, the Elk River colliery of the Crow's Nest Pass Coal Co., Ltd., Fernie, B. C., took top honors. Only coal mines employing 50 or more men are eligible for the yearly awards.

And for Your Information . . .

"The most powerful sales and advertising effort in the history of the industry," the Anthracite Institute calls its new network television program which began May 5 over 12 stations in the anthracite market area. Star-ring Norman Brokenshire, "The Better Home Show" is a half-hour homemakers program that will reach consumers with direct product and equipment demonstrations in their own homes.

The Pennsylvania State Sanitary Board has ordered 16 coal mines either to cease polluting streams or close down their operations, charging violations of their operating permits.

Three strippers near Harrisburg, Ill., are being sued for \$40,000 damages on the complaint that large mounds of dirt piled up by the companies caused a creek to overflow and damage farm lands owned by the plaintiffs.

An 18-yr-old fire in the San Juan mine coal at La Ventara, N. M., has been extinguished under a \$33,000 contract awarded by the USBM, it has been reported. Some 4 million tons of coal reserves were saved, the Bureau said. The Bureau also has announced the award of a \$63,000 contract to Parker Bros., Sheridan, Wyo., for stopping a coal fire in Campbell County, Wyo-

An unusual step is indicated in the report that the Fetterolf Coal Co.,



KOPPERS Ar-Moored MINE TIES



Koppers Ar-Moored Switch Tie Set

Nothing is tougher on ties than being lifted and relaid. Ordinary mine ties soon succumb to "spikekill" . . . usually are scrapped after being relaid four or five times. Not so with Koppers Ar-Moored® Ties! One user reported that he relaid his ties over fifty times and then "quit keeping count."

For temporary track in mechanized mines, Koppers Ar-Moored Switch and Cross Ties are ideal. Not only can these ties be relaid easily, quickly and repeatedly, but they also provide a stable, strong track with accurate gauge-a track that stands up under heavy mine traffic.

Koppers Ar-Moored Ties have preformed, prebored, pressure-creosoted oak bases, topped with Bethlehem Steel Mine Ties. This combination of steel, plus decayresistant wood, results in ties that maintain rail alignment, thus helping to eliminate derailments. Moreover, these ties are tampable; they do away with spiking and gauging; they resist damage caused by caterpillar tracks.

Add up all these advantages and you'll see that it's safer, easier and more economical to use Koppers Ar-Moored Ties. For further information, send for our free book: "10 Proven Ways to Cut Mining Costs." It also describes how you can effect substantial savings by using Koppers Pressure-Treated Wood in many other ways. There's a handy

coupon below. KOPPERS COMPANY, INC., Pittsburgh 19, Pa. KOPPERS PRESSURE-TREATED WOOD Konners Company, Inc. Pittsburgh 19, Pa. Please send me a free copy of "10 Proven Ways to Cut Mining Costs," City..... Zone.... State.....



Boswell, Pa., has petitioned the state labor relations board for a union representation election, which the UMWA is opposing. If the election is granted, employees would choose between being represented by District 2, UMWA, or no union.

"Newspaper Advertising Service for Bituminous Coal Retailers" now is available from the Coal Heating Service Div., NCA, and may be secured by non-member dealers without charge. The 36-p booklet offers an assortment of copy ideas, headlines and illustrations, with suggestions on how to prepare both large and small advertisements.

The total fatality rate for bituminous and anthracite mining combined for the first 3 mo of 1951 was 1.29 per million tons, as compared with 1.39 in the same 1950 period. The bituminous rate in the period was 1.19, against 1.27 in 1950. Anthracite had 26 deaths in the first 3 mo of each year, for a rate of 2.63 in 1951 and 2.51 in 1950.

Court Favors Company in Pewee Mine-Seizure Case

The U. S. Supreme Court, acting April 30 on the Pewee Coal Co. mineseixure case, ruled that the government must pay \$2,241.26 to the company for losses incurred during government seixure and operation of the mine during the long strike in 1943. In reaching its 5-to-4 decision, the Supreme Court upheld an earlier decision of the Court of Claims. The award was fixed to cover losses due to increased wage payments made to comply with a War Labor Board decision but did not compensate for additional operating losses of \$33,887.70 arising from other causes.

The precedent-making decision, now being studied by employers, unions and government officials concerned with preventing strikes in critical defense industries, appears to protect property owners against losses resulting from government operation of their facilities and to lessen chances that the government will seize plants and put wage boosts into effect. For the government, the decision raises the question of how to enforce rulings handed down by federal labor-disputes agencies.

Specifically, the case of Pewee Coal Co., Knoxville, Tenn., grew out of federal seizure of the Nation's bituminous mines in May, 1943, to prevent a strike by the UMWA. Under seizure, the government effected a WLB grant that increased vacation allowance and refunded the cost of lamp rentals to the miners. These increases resulted in added costs of \$2,241.26, the amount of the court's award. The remaining losses, amounting to \$33,887.70, resulted from tonnage reductions growing out of mining methods that caused a roof to collapse.

DEWATERING FINE COAL



... without Degradation!

... with Clean Filtrate!

D OIT the American way. A play on words? Yes, but nowhere can you find a more effective, higher capacity unit for dewatering fine coal than the American Continuous Filter.

Better yet, nowhere can you find a unit which, considering the stream pollution problem confronting coal companies, will do what a real dewaterer is supposed to do: separate solids from liquids without letting the solids through in damaging percentages. Filtrate from the American Filter handling fine coal (\(\frac{1}{2}\) is " and under) carries on the average less than \(1\) solids.

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We have laboratory facilities and field test units for determining the best filter station. And we have several types of dewaterers to complement the American where sizes are such as to call for a different filter.

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Labor Board Denies Operators' Complaint

General Counsel George R. Bott, National Labor Relations Board, has rejected a petition by 12 West Virginia coal operators that he issue an unfairlabor-practices complaint against certain UMWA locals for alleged violations of the Taft-Hartley Act.

The operators, members of the Kanawha Coal Operators' Association, charged that although there is no nostrike clause in the master wage agreement, the locals violated the agreement and the law by trying to force concessions by wildcat strikes rather than by the grievance procedure in the contract.

The main charge against the locals was that they did not give 60 days' notice. Mr. Bott upheld a regional director's ruling that such notice was not required because the union was not seeking to modify or end the contract.

The operators cited the following incidents, among others, in support of their petition: a strike over failure to pay overtime on Saturdays when those Saturdays were not the sixth day worked in the week; a strike over callin pay for men sent home because of a power failure; a strike by one shift over which crews would work on idle days; refusal to enter the mine in wet mine cars; a strike over pay rates for a coal loader when loading rock; a strike over the lay-off of 134 men without notice to the union, though economic distress forced the lay-off: a strike because the company had discharged safety committeemen who reported unsafe conditions and refused to let workers enter the mine; and a strike against a company because a lessee failed to make welfare-fund

First Gordon Conference On Coal Planned

The first Gordon Research Conference on coal will be held June 25-29 at New Hampton School, New Hampton, N. H., with G. D. Creelman, research co-ordinator, M. A. Hanna Co., and chairman of the fundamental re-search committee, BCR, presiding. Originated 20 yr ago by Dr. Neil E. Gordon, Johns Hopkins University, the conferences run through the summer with a week devoted to each of a variety of subjects in the fields of chemistry and allied sciences. The conference on coal covers subjects in the fields of composition, basic reactions and decomposition products.

Gordon conferences for many years have been sponsored by the American Association for the Advancement of Science, and their purpose is achieved in informal, off-the-record meetings, consisting of scheduled lectures and free discussion groups. No proceedings will be published.

Dr. W. George Parks, Department of Chemistry, University of Rhode Island, Kingston, R. I., is registrar, and attendance is limited to 100.

now ... Track Cleaning Cost is \$..0 Minus for 1951



Says One
Superintendent:
"Cost of cleaning track is a minus quantity."
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Efficient Performance —Mine Proven

OF all recent developments in mechanical mining, the Canton Track Cleaner is perhaps the greatest money maker—per "use-time." No track workers to get hurt. Clean tracks once thoroughly with the Canton Track Cleaner. Then subsequent cleanings yield good coal. Load cars higher, haul more tonage. Reclaim spillage mechanically. Write us for name of nearest mine where you can make inspection.

Digger plate raised or lowered by hydraulic pump. Wings adjusted up or down, in or out, independent of each other. Front conveyor floating type, handling large rock. Boom conveyor can be raised or lowered. Machinery protected with shear pin, quickly changed. Standard Wings clean 51 inches from center of track gauge. Extensions to wings permit cleaning wider space. Length 21 ft., width to conform to haulway. Weight 6,500 lbs.

Performance Records . . .

B93 three-ton cars on time and one-half, were loaded with machine at a cost of \$.462 per ton. Hand loading (estimating five 3-ton cars per man per shift) would cost \$1.31 per ton. Total cost at \$19.575 per shift for 893 cars with machines—\$1257.32. Same number of cars, hand loading, would cost—\$3509.49. Would the saving of \$2252.17 have any effect on your cost per ton of coal? Another company loaded 887 tons at a cost of \$.465 per ton, cleaning 27860 ft. of track at \$.015 per foot. (Names on request.)

Write us what your 1950 track cleaning costs were . . . and how many miles of track you clean, and we will show you how much extra profit you can make in 1951 with a "Canton" Track Cleaner, after it has paid for itself.

Write for complete data. Please use street and zone numbers.

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Mechanical Track Cleaners . . Automatic Doors . . Destributors . . Car Transfers . . Automatic Switch Throws . . Cable Splicers and Vulcanizers.



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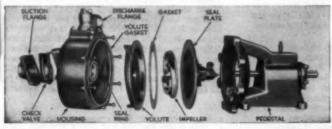
They save costly shut-down time—they will run indefinitely requiring little or no attention, are automatically self-priming—ideal for remote location and control.

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These pumps are farnished bronze fitted, and all bronze construction.

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COAL MEN ON THE JOB



RED JACKET COAL CORP., Red Jacket, W. Va.—E. S. Ferrell (left), essistant super-intendent, Mitchell Branch and Coalburg mines, and A. F. Cook, general superintendent of Mitchell Branch, Junior, Coalburg and No. 17 mines.



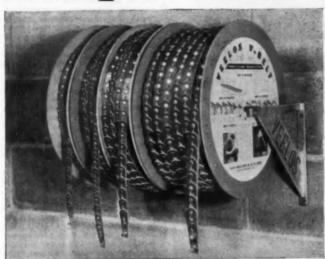
RED JACKET COAL CORP., Red Jacket, W. Ya.—C. H. Price (left), chief electrical engineer, and C. H. Williams, assistant chief engineer.

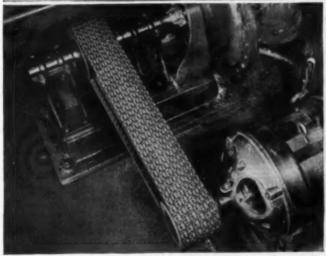
Did You Know?

In Illinois, earnings of bituminous coal miners in January averaged almost \$30 a week more than the average of all employees in manufacturing industries, according to a survey by the Illinois State Employment Service and Div. of Unemployment Compensation. Bituminous miners averaged \$97.11 weekly in January, as compared with \$67.36 for manufacturing workers.

Pennsylvania strip-mine operators up to March 1 have filed bonds totalling \$5,158,798 with the State Department of Mines to guarantee restoration of stripped lands as provided by law, the department recently reported. A total of 1,162 operators registered up to that date and have paid \$265,200 in filing fees. Some \$59,179 in bonds has been forfeited by operators, the report indicated.

Veelos-the Adjustable V-Belt Pays for Itself





ADJUSTABLE TO ANY LENGTH . ADAPTABLE TO ANY DRIVE

Made in all widths in three types; regular, all-proof and static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. Veelos is known as VEELINK outside the United States.

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Veelos pays for itself because it can be installed quickly and easily without dismantling outboard bearings or moving motor. Individual belts can be adjusted by simply removing or adding links.

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Veelos pays for itself because uniform tension can be maintained on all belts to provide vibrationless, full power delivery. Simple adjustment of each belt means that matched sets stay matched.



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Just Name It - the "700 can weld it ... braze it ... or cut it.

Noted for its versatility, this exceptional torch is designed to handle oxyacetylene welding and brazing repair work in your shop . . . and when equipped with a multi-flame tip, it is unbeatable for pre-heating fenders prior to straightening. Also, with the addition of a cutting attachment, the "700" is easily converted to handle occasional cutting jobs.

The new "700" is highly recommended for repairing torn fenders, body braces, headlight brackets, bumper supports, and many parts,

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New Developments

Leasing of 3,000 acres and plans for development of a \$3,000,000 deep mine near Shawnestown, III., were announced early last month by the Bransford Fuel Co., Nashville, Tenn. The property lies along the Ohio River and shipment by barge is anticipated, with an output of 1,000,000 tons annually being planned.

Purchase by the American Cyanamid Co. of a plant site with a long-term lease of coal reserves on property of the Clinchfield Coal Corp. in southwest Virginia was announced last month. Future development of the properties for the manufacture of chemicals, utilizing coal furnished by Clinchfield Coal, is under consideration by American Cyanamid.

Opening of a strip mine near Belleville, Ill., being planned by the newly organized Peoria Coal Mining Co. Among the incorporators of the new firm are Charles Thomas and Robert T. Whiteraft, associated with Morgan Mines, Inc., it was reported.

The strip mine of the Bruns Coal Co. at Gilbert, near Zaneaville, Ohio, has been acquired by R. L. Wilhelm, St. Clairsville, and will be operated as

the Gilbert Coal Co. An investigation into the closing last month of Mine No. 15 of the Bell & Zoller Coal & Mining Co., Mt. Olive, Ill., was called for in a resolution approved by the Illinois State Senate May 16 and approved the previous day by the House. Officials of the PMWA local had telegraphed the governor and members of the legislature that the mine had been closed "without warning or explanation" although newspaper reports indicated that the property had been worked out. The mine was one of those purchased by the Zeigler interests from Consolidated Coal Co. earlier this year and employed some 300 men. Closing of the No. 1 mine of the Superior Coal Co., Gillespie, Ill., as uneconomic was reported May 10, and high operating costs also were given as the reason for the closing April 25 of Mine No. 47 of the Peabody Coal Co., Harco, Ill. No. 47 preparation plant will continue to handle coal from Mines Nos. 40 and 43.

Foreign Developments

British Coal Crisis Eases

A definite easing of Britain's winter coal shortage was indicated in production reports for the first 3 mo of the year released during April. Although, with the advent of warmer weather, output in May was expected to exceed consumption for the first time, no immediate relaxation of the restrictions on coal use was anticipated since it was planned to build up stocks to a safe level first. During the first 10 wk of 1951, reports show-

ed, the working force had been in-creased by some 12,800 men, which, with Saturday working and an in-crease of about 3% in output per man-shift had resulted in an production some 1,500,000 tons greater than in the same period of 1950. With the continued improvement expected, it was thus believed possible that the government's goal of an additional 3,000,000 tons by the end of April might be reached.

ECA Summarizes Aid to Europe For Boosting Coal Supplies

Although the Marshall Plan has helped increase Western European coal production by 13% over 1947, output has not kept pace with consumption and participating countries will have to import a "considerable amount" of coal from the U.S. this year to support their defense efforts, the ECA, now entering its fourth year of aid, reported in April. Mar-shall-Plan financing for the import of coal, discontinued during the second year of the program, was re-sumed in March and so far totaled \$14,800,000, the report said. Most of it was slated for France, with Den-mark receiving some \$600,000 and Iceland \$100,000.

In summarizing its assistance in boosting coal production, the ECA said that participating countries had spent the equivalent of nearly a halfbillion dollars in counterpart funds for that purpose, and that Greece, Turkey and Italy had obtained \$20 million in direct aid to purchase specialized U.S. equipment for coal-development projects. Participating countries now are producing 475 million tons annually and are expected to increase the rate to 490 million by June, 1952. Output per man-shift has increased moderately since the start of the Marshall Plan. Western European output is not quite up to the 1938 level, it also reported.

Use of the dollar-equivalent of counterpart funds by participating countries was reported as follows:

France has spent \$346.8 million to provide miners' housing, modernize coal mines and increase production in related industries. It is now producing 54 million metric tons annually, 1 million tons short of the 1929 record. Germany has used \$72.4 million to expand coal production. Output of hard coal, its major export, is 114.6 million metric tons annually, considerably under prewar. Present daily output of 380,000 tons is expected to increase to 425,000 by June.

With an annual production of 2.5 million metric tons, slightly over prewar, Austria produces only 30% of its total needs. Some \$9.4 million has been used to develop the Langau lignite mine and to purchase equipment for other coal mines. ECA has provided Greece with \$3,873,000 to finance engineering services and U.S. equipment on the island of Euboea, How deep is the overburden?

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for a coal-mining project which will furnish lignite for a new electric plant.

ECA direct dollar aid to Italy totals \$3,413,000 for the mechanization and development of Sardinian coal mines, with \$7 million for additional costs provided by that country. Italy now produces 1.5 million metric tons, slightly over prewar. Turkey's output of 3 million tons also is slightly above prewar. The ECA is financing more than \$12 million in equipment for two coal mining projects, one to modernize the Zonguldak bituminous mines and the other to develop lignite output in the western part of the country.

New Zealand Seeks Repeal Of Coal Nationalization

The New Zealand cabinet has originated a bill to repeal an act of 1948 which vested in the state the ownership of all privately owned unworked coal in the dominion. The act was passed under the former Labor administration.

It proved unworkable because the compensation claims of the owners could not be reconciled with the government's settlement terms. The owners claimed a sum of about £1,500,000,000,000), equivalent to about three times the dominion's entire national debt. The Labor government offered a "global" sum of £600,000 (\$1,680,000), which the coal owners were to divide among themselves as determined by a valuation commission. This sum corresponds to fifteen times the amount of royalties paid during the years 1941-47 by the coal owners.

Actually less than haif the "global" payment would have gone to genuine private coal owners as the government owns all the shares in the Taupiri Coal Co., New Zealand's largest. An amount of £335,217 would have been payable to this company alone, returning to one government pocket what came out of the other.

A clause of the repeal bill provides for the financing of mine-town facilities by a levy of 3%c a ton on all coal taken from any mine, whether government-controlled or private.

Canada Boosts Aid for Rail Shipment of Coal

Government subventions to help meet freight rates on western coal moving to eastern markets are being increased, Mines Minister Prudham announced April 28.

The increases, ranging from 35c to \$1 a ton, will go towards meeting a freight-rate boost of around \$2.35 a ton that went into effect April 1. The extra assistance applies on high-quality coal from Alberta and the Crow's Nest Pass area of British Columbia and is in addition to a \$2.50 per ton subvention already being paid on coal carried east of the Lakehead.

NOVA SCOTIA — Nova Scotia's coal may be used to furnish electric power needed to develop Gaspe's rich copper mines and help in a vast plan to complete electrification in the Gaspe Peninsula, Premier Maurice Duplessis recently stated. Government technicians are "seriously" considering a plant to develop 200,000 hp in the town of Gaspe itself, with an electric-power plant burning Nova Scotia coal as its source of energy, he said.

Until now, the Government had planned harnessing the Madeleine River to provide electric power for the copper development undertaken by Noranda Mines, Ltd. However, the river can produce a maximum of only 25,000 hp, the premier said, and the Government has scrapped the idea.

With a power plant at Gaspe using coal, "or possibly oil," there would be enough electricity for the mining developments and to put electricity through the Gaspe Peninsula. However, the premier said, no definite decision has been taken but the government is studying the matter seriously.

ITALY—The government plans to import nearly 1,000,000 tons of coal monthly during the second quarter of 1951, it recently was reported. The imports are needed to replenish stocks that have continued to decrease in spite of heavy imports in the first 3 mo of the year, it was said. Total imports reported were: January, 470,000 tons; February, 700,000; March, 800,000. Imports from the U.S. alone in January and February were 75,000 and 240,000 tons, respectively.

AUSTRIA—The Austrian government has requested the ECA mission in that country to authorize the import of 150,000 tons of coal from the U.S.

GREECE — The appointment of Pierce Management, Inc., Scranton, Ps., as mining advisors to the Greek government on the Ptolemais lignite project for a period of 3 yr recently was announced. Involving a cost of \$18,000,000, the project includes openpit mining of 3 million tons of lignite annually, manufacture of 600,000 tons of briquets yearly and the construction of a 40,000-kw power station.

New Books for Coal Men

Engineer's Pocket Book

The Practical Engineer Pocket Book, 1951, by N. P. W. Moore. This new edition of an old standby contains new data on compression-ignition engine fuels, supercharging and gas turbines, together with many revised drawings and technical dictionaries in German, Spanish and French. Other sections of special interest to coal

for more efficient coal preparation



Hendrick Wedge-Slot Screens

These continuous slot screens are unequalled for a wide range of screening and dewatering operations. For heavy media, they are used as chute bottoms for dewatering and media recovery; for drum and wheel sections; on vibrators. For jigs and other wash box types, they are used for jig bottoms; and for dewatering and wet screening on shakers, vibrators, and stationary equipment.

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Helps to Promotion

Coal Mining, by D. C. Jones and J. W. Hunt. A new edition of a 3-vol series written for extension-class students in coal mining. Vols. I and II include basic technical data and materials for study for examinations. Vol. III is for advanced mining students. Mineral Industries Extension Services, Penn State College, State College Pa. 1,254 pp total. \$12.50 per set.

Other Books and Booklets

Aging Characteristics of Electrical Insulation. New method for measuring aging characteristics. PB-102619, U.S. Dept. of Commerce, Office of Technical Services, Washington 25, D. C. 13 pp. 50c.

Geology of Anthracite in the Southwestern Part of the Mt. Carmel Quadrangle, Pennsylvania, by H. E. Rothrock and H. C. Wagner. Three sheets comprising Map C7. 38x44-in each. Chief of Distribution, U.S. Geological Survey, Washington 25, D. C. \$1.50 per set; base map, 50c.

Geology of the Fort Smith District, Arkansas, by T. A. Hendricks and Bryan Parks. Geological Survey Professional Paper 221-E. Superintendent of Documents, Govt. Printing Office, Washington 25, D. C. \$1.

Bureau of Mines Approval System for Respiratory Protective Devices, by S. J. Pearce. I.C. 7600. Publications Distribution Section, 4800 Forbes St., Pittsburgh, Pa.

Preparation Characteristics of Coal Occurring in Armstrong County, Pa., by W. L. Crents, Fern Steele and A. L. Bailey. R.I. 4788. Publications Distribution Section, 4800 Forbes St., Pittaburgh. Pa.

NCA Marks Advances, Scans Coal's Prospects Begins on p 166

Cooperative projects now under way include marine smoke abatement, fly-ash reduction, gas producers, railroad electrification, block heating, electric steel furnaces, and a "package" boiler unit. In addition, Mr. Tobey traced developments in development of the coal-fired gas-turbine locomotive and new mining machinery and equipment. All undertakings are aimed at selling more coal and bringing better prosperity to the coal industry, Mr. Tobey said.

More well-trained young men are entering the coal industry because of the efforts of the Committee on Vocational Training and Education, said H. C. Woods, committee chairman and vice chairman of the board, Sahara Coal Co., Chicago, Stressing the special need for more undergraduate and graduate scholarships for coal-mining engineers, Mr. Woods also reviewed the committee's distribution of information to educational organizations and institutions, its cooperation with mining institutes and associations, its interest in a plan to train mine electricians and mechanics and its concern with draft deforments.

Other committees reporting included the Coal Defense Committee, which aims at coordinating all interests concerned with coal and the defense program; the Committee on Interstate and Foreign Commerce, which seeks fair treatment from the railroads in rates and availability of coal cars; the Committee on Natural Resources, which has expressed the industry's opposition to imports of oil in "dump" quantities: the Land Use Committee, which works with state legislatures and mining interests in efforts to restore strip lands; and the Membership Committee, which reported a net gain of some 2,500,000 tons in supporting membership since the last NCA meeting. Laurence E. Tierney, president, Eastern Coal Corp., and Joseph T. Berpresident, Pennsylvania Coal & Coke Corp., reported for the commerce and membership committees respectively, and Mr. Battle reported for the committees on defense, natural resources and land use.

Exports of coal to Europe now are running at a rate of 18 to 20,000,000 tons per year, said John S. Routh, president, Coal Exporters' Association of the United States, Inc., and president, Routh Coal Corp., New York City. Further reports on the prospects for export are found on p. 167 of this issue.

Coal Heating Service now numbers 87 retailer groups serving 300 communities and handling 15,000,000 tons annually, said J. Nelson Stuart, manager, CHS Div., Washington, D. C. These local groups are financed by local assessments and NCA contributions at an annual rate of \$530,000, with more than half of the sum coming from local groups. About \$307,000 is spent annually in support of selling and servicing coal and for training retail personnel.

With a new simplified contract, known as Plan 3, some 85% of the income of new-type groups will go directly to these purposes. In addition to their domestic business, some CHS groups now are servicing commercial and off-track industrial tonnage and thus are saving some tonnage that might have switched to other fuels, Mr. Stuart said.

Major steps taken by CHS in the last year include preparation and promotion of the "Step-Up Sales Training Program," broadening of CHS operations in some areas to include all retailers, distribution of slide films on deliveries and customer relations, establishment of a newspaper advertising service, and circulation of a sound



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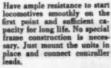
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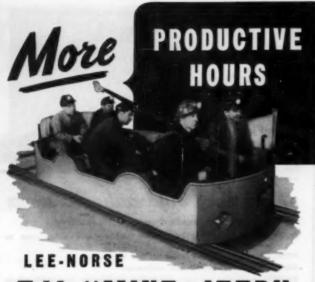
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motion-picture film in color, "Your Business Begins in the Customer's Basement," produced in cooperation with CHS of Des Moines, Iowa.

"A mere rear-guard action will not suffice to meet the increasing use of oil and gas for home heating,' warned J. C. Harkness, associate, A. T. Kearney & Co., Management Consultants, Chicago. To meet the situation, he urged coal producers to initiate a frontal attack on retail customers through four channels: product, deal-er personnel, product advertising, and their own sales personnel. Mr. Harkness' remarks were based on a broad survey of domestic fuel customers recently undertaken by his company. He stressed the importance of cleanliness, uniformity of product, consistency in delivery and closer relations between producers and retailers. Likewise, he urged more emphasis on product advertising, more CHS units, and a re-appraisal of producer sales personnel and sales territories.

"The Marketing Committee is unani-mous in its opinion that the producers of bituminous coal and their sales agents should continue to spend time, money and effort in cooperation with the retail distributors of their product," said H. A. Glover, NCA Marketing Committee chairman and president, Island Creek Coal Sales Co., Huntington, W. Va. Stating that the vast majority of retail dealers are ready and willing to wage an aggressive fight against competing fuels if producers will help them with practicable and effective plans, Mr. Glover urged NCA, in view of increasingly tougher competition, to coordinate and broaden all activities affecting marketing. Problems calling for attention include the following: transportation costs, more efficient burning equipment, technical advice to consumers on using and maintaining burning equipment, broader uses for coal, more training in merchandising and service, and more advertising.

Anthracite Conference Views Marketing Progress Begins on p 168

1. Offer free annual inspection of heating equipment and heater-conditioning at reasonable cost.

2. Promote sale and use of automatic equipment and heat-regulating devices.

 Maintain an aggressive campaign of local advertising, using material new available from the Institute and manufacturers.

Field representatives are conducting dealer training courses to raise standards of service, Mr. Curtin reported.

With regard to the influence of architects and builders, Mr. Curtin noted that many are more uninformed than prejudiced, and suggested that anthracite salesmen approach them with advice for straightening out their design figures, oil-to-coal ratios, specification of sizes for various applications and

Probable benefits of wider utilization and better public relations for anthracite have become evident to engineers of the Institute's fuel and heat. ing consultant service, Mr. Fagan said in describing the goals and accomplishments of the service since its inception in August, 1950, Goals are (1) to hold present tonnage by advising commercial users of anthracite on the most efficient sizes for specific burners, burner maintenance and coal- and ash-handling, and (2) to promote anthracite as a fuel in new construction by stressing economy and safety to builders.

Mr. Fagan reported unusual success in convincing school boards of the benefits of anthracite heat, with newschool construction in New York now running at about \$50 million per yr.

With population and dwelling-unit count rising in the anthracite market areas of Quebec and Ontario, Canada is a valuable and natural outlet, Mr. Lottridge said. However, the distribution of automatic burners is far from gratifying because of the high cost of the units. This may be offset to some degree by a recent Canadian order lifting import restrictions and by the price advantage enjoyed by anthracite in the market area. Mr. Lottridge reported that higher consumption of anthracite in Canada may reflect current progress in smoke abatement.

progress in smoke abatement.

Lead-off topic of the second morning session, a symposium on current anthracite problems requiring dealer assistance, was presented by George Brenfleck, Robert S. Vail, James R. Farrington, Robert C. Miller and Lester R. Weller, all retail-dealer members of the Fuel Merchants Association of New Jersey, with Hugh O. Tompkins, managing director of the association, as moderator. The symposium was followed by papers en-titled, "Smoke Abatement," by Austin C Daley, air pollution engineer, Providence, R. I., and "Central Heating of Broiler Houses," by S. L. McHenry, assistant extension poultryman, University of Delaware, delivered by Dr. A. T. Ringrose, associate professor of poultry research. C. M. Dodson, president, Weston Dodson & Co., Bethlehem, Pa., was session chairman.

Presenting a dealer's views on the subject of quality, Mr. Brenfleck stated that the dealer suffers a loss of prestige with fluctuations in quality, with such fluctuations often apparent in coal from the same producer. Stressing that only the best is good enough, Mr. Brenfleck added that the dealer has a responsibility for maintaining quality; that is, efficient handling in the yard to prevent degradation and contamination.

In addition to the traditional price advantage, summer stocking of anthracite in retail yards offers savings in labor cost because unloading is easier, Mr. Vail said in listing consumerand-dealer benefits of summer buying.

PORTABLE COAL PREPARATION UNITS



(Patent Pending)

e Comprised of hopper, feeder, screen, picking table and single roll crusher. Capacity—125 or 130 tens per hour. Large heavy-duty Timken double-row roller bearings in the eccentrics and pillow blocks. Over-size Torrington spherical roller bearings in the crusher. The crushers are adjustable from 34" to 10" opening. Screened coal over the picking table is diverted by a flap-gate to the crusher or mixed with the slack for mine-run. The screen has a snappy action, resulting in efficient screening.

The picking table has a smooth motion which allows selective picking of the impurities which are disposed of in the trough running over the center of the picking table.

The unit is equipped with magnetic starters and push-button controls, 10 to 15 HP motor on the crusher, 5 HP motor on the screen and picking table. It can be readily transported from one location to another on a standard long-whoelbase truck, with minimum cost for moving and erecting.

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The use of oversized anti-friction bearings throughout these two unit sixes insures trouble-free operation, with low power and maintenance costs.

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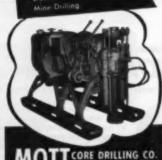
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Anthrocite Conference

The consumer gets faster delivery, lower costs, protection from shortages during the heating season and a stainless cellar floor because of the absence of freezeproofing compounds. Mr. Vail suggested that both dealers and producers store anthracite in the summer to the limit of their capacities to prevent distribution delays in the winter.

Messrs. Farrington, Miller and Weller discussed the retailing of automatic burners by fuel dealers-pro and con. Mr. Farrington, operating in a rural area, reported that sales and service charges exceeded commissions in his experience, and concluded that population is too thinly concentrated in rural areas to justify the promotion of automatic heating.

Mr. Miller, selling in the vicinity of Princeton, N. J., reported a successful sales program in a high-income area, which might be expected to lean toward the convenience of competitive fuels. Mr. Miller advocated the following:

1. Keep abreast of new developments in heating equipment.

2. Maintain an adequate inventory of parts and supplies.

3. Employ a service truck and trained mechanic.

With regard to promoting automatic heating, there is no question: it is a necessity, Mr. Miller said.

Mr. Weller, operating in the vicinity of Asbury Park, noted that most domestic-fuel consumers are sold on convenience and resist solid-fuel burners because of attendant ash, fly-ash and dust. Also, because of discouraging incidents with new equipment, many po. tential users of automatic heat are not convinced of automaticity. Further, few dealers can make the required investment to enter the field of equipment sales and service.

Reporting on smoke abatement in Providence, R. I., where 250,000 people live and work in an area of 19 sq mi, Mr. Daley emphasized that support of the citizenry is required for effective control of air pollution. Disciplinary fines and legal action should be a last resort, because many violators may require only competent advice to eliminate offending smoke. Conversion to anthracite or admixing anthracite with other fuels are excellent solutions to smoke problems, Mr. Daley said, in pointing out that 50,000 tons of anthracite has been used in this manner in Providence since July, 1950.

The sum of all fuels used in heating broiler houses in the DelMarVa region is equivalent to 60,000 tons of rice anthracite per year, according to Mr. McHenry. Pointing out that this market is not seasonal and that central heating on such farms is becoming more popular, Mr. McHenry concluded that the cost advantages of anthracite make it especially attractive for this application. Also, since many farms in the area have ample storage room, anthracite could be bought in



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carload lots for even greater economy.

In the discussion which followed the morning program, Mr. Earnest cautioned dealers to consider long-range national fuel policy before giving way to pessimism in regard to anthracite's future. We are fast approaching a national fuels-conservation policy, and even oil officials recognize the need for rationing their products in the event of an emergency, Mr. Earnest declared.

A. C. Fieldner, chief fuels technologist, U. S. Bureau of Mines, in describing the Bureau's coal-to-oil investigations, stated that as much as 50% of the intrinsic heating value of the coal is lost in conversion. Therefore, coal should be used in its solid form, if possible, to provide maximum conservation of fuels.

Speaking for the manufacturers of the Electric Furnaceman, Mr. Simpson presented his objection to warehousing of burner parts, as follows: In 1950, replacement-part requirements for 400 automatic installations (Electric Furnacemen) averaged \$1.69 per installation. Thus, a pressing need for regional warehouses is not indicated.

Present preparation practice, a new rapid method for testing fine-coal plants, metallurgical uses of anthracite, and progress in mining and utilization research were subjects at the afternoon session. Speakers were: Dr. R. T. Gallagher, associate professor of mining engineering, Lehigh University; Paul A. Mulcey, director, and J. W. Eckerd, senior engineer, Anthracite Institute Laboratory; D. W. Gillmore, research assistant, and Dr. C. C. Wright, chief, division of fuel technology, Pennsylvania State College; John W. Buch, chief, anthracite subregion, and Andrew Allan, Jr., mining engineer, Bureau of Mines Anthracite Laboratory, Schuylkill Haven, Pa.: D. E. Ingersoll, division superintendent, and R. S. Davies, superintendent, Newkirk colliery, Philadelphia & Reading Coal & Iron Co., Pottsville, Pa. Dr. R. C. Johnson, vice president—re-search, Anthracite Institute, Wilkes-Barre, was chairman.

Dr. Gallagher presented a survey of present practices and equipment in 42 preparation plants operated by 17 companies. C. G. Schantz, fuel engineer.

Weston Dodson & Co., was co-author. Messrs. Mulcey and Eckerd told of progress in ash-handling and burner research and agricultural uses of anthracite, respectively.

Ash determinations for minus %-in coal now can be estimated in 4 min if the 25-gram sample contains less than 2% moisture by a centrifugal method which appeared promising to preparation officials of the Lehigh Navigation Coal Co., Mr. Gillmore reported. In describing his joint investigation of the centrifugal method with R. W. Shoenberger, research assistant, Pennsylvania State College, Mr. Gillmore pointed out that even with samples exceeding 2% moisture, ash determinations can now be made in about 13 min, including sample drying time.



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Anthracite Conference

This is a marked reduction in the 75 min required for air combustion or the 45 min required for oxygen combustion. Thus, the centrifuge method tightens control of fine-coal plants, Mr. Gillmore said.

The method consists of centrifuging 25 grams of dry product in 50 cc of carbon tetrachloride and bromoform (1.80 sp gr) and recording the volume of sink material. Ash content is read from a previously prepared calibration curve of actual ash contents against sink volumes for the material handled in the plant. This quick estimation of ash values is a great aid to efficient plant control, according to the authors.

Outlining the applications and limitations of anthracite as a metallurgical fuel. Dr. Wright summed up, as follows: Essentially, anthracite is used to supply carbon for the particular process involved. In general, it offers no superior properties that insure special consideration, and its main advantage is availability in quantity at a competitive price. In some applications, ash and sulphur content may be critical, but in most the value of the anthracite will be a matter of cost per unit of carbon delivered.

Probably the major portion of the 500,000 tons per year of anthracite for metallurgical applications consists of fines for blending purposes, and it appears that this market can be retained and possibly expanded in the future, Dr. Wright said. The direct use of egg or broken sizes in blast furnaces appears to have technical limitations inherent in the anthracite itself, which confines its use to coke-anthracite mixtures containing from 5 to 12% anthracite. Until such time as captive coke facilities can supply steel-industry demands, substantial tonnages of anthracite could be sold for this purpose in competition with merchantplant coke, Dr. Wright added. Broken and grate sizes in mixtures with foundry coke are being successfully used in cupolas, and smaller buck sizes for sintering and direct ore-reduction give promise of developing into a substantial market. In both instances the demand for anthracite will depend on the competitive price structure of anthracite and coke or other suitable fuels, Dr. Wright said.

In leading off the closing symposium, which was a progress report on mining research activities, Mr. Buch listed the criteria to be satisfied before a project is accepted for further study and development by the Anthracite Laboratory of the Bureau of Mines. The project, at its inception, must hold promise of these benefits: (1) lower cost, (2) higher recovery, (3) improved quality of the mine product and (4) increased safety. "To devise and to continue to devise new and better ways of doing things are essentials for corporate existence in the highly competitive industrial fields of our nation today. The anthracite in-





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Quik-Lift Electric Holsts * Heist-Alls Mighty-Midget Pullers * Spur-Geared Haists * Differential Chain Haists * Load Binders * I-Beam Trellays dustry is no exception, although the pace may not seem nearly so rapid," Mr. Buch said, in pointing out that natural limitations, peculiar to anthracite, govern the rate of development of new methods and equipment. Messrs. Allan, Ingersoll and Davies described progress in current projects, as follows:

1. The scraper-shaker loader was designed to eliminate transportation delays in driving gangways in thin, steeply pitching seams, thus permitting, drilling, blasting and loading of a full round to be completed in a single shift. The original air-powered unit, built by the Bureau, has been improved in design and electrified, and now is under test at a mine in the northern field. Satisfactory performance is indicated.

2. Lightweight shearing machines, used in gangway and airway development in the southern field, have resulted in advances of 9 ft per 7-hr shift, with a duckbill in the gangway and a scraper in the airway for loading. Two men worked each place. At another mine, in the northern field, a universal-type machine was used to drive a 6x7-ft opening through a 300ft chain of chamber pillars to determine if the machine could drive a pillar road without shattering the roof or ribs. While the machine proved to be not suited to such work without modifications, it was demonstrated that a 6-ft advance could be made in 4% hr, as compared with an advance of 5 ft per shift with hand mining. Consumption of explosives with the machine was about half that with hand mining.

3. Electric load cells have been designed for continuously recording the magnitude and rate of change of roof loads as part of the research in the development of a tunnel shield. The cells also may be used to obtain valuable information for recovering anthracite beds that lie at great depth, where strata control is more difficult because of higher pressures.

4. Longhole retreat mining experiments have been completed in a 10-ft seam pitching 82 deg. Briefly, the benefits are: increased safety, high quality with regard to size and dilution, high productivity (11.1 tons per manday) and low explosives consumption (0.105 lb per ton of coal).

5. Lightweight concrete roof supports, underground compressed-air receivers and pneumatic packing are projects now being investigated.

Projects for the future are the Becorit prop, recovery by block caving and further development of longhole methods. The Becorit prop, a German development, will support a load of 50 tons before yielding, and investigations will determine if it can be used to support mined-out pillar areas until backfilling can be done. If this can be done, large tonnages of low-cost coal will be made available, thus more than doubling the life of many existing collieries.

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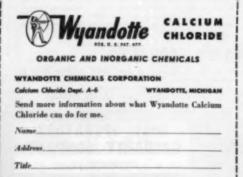
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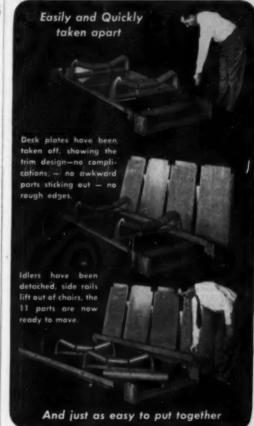
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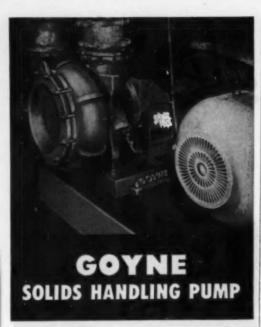


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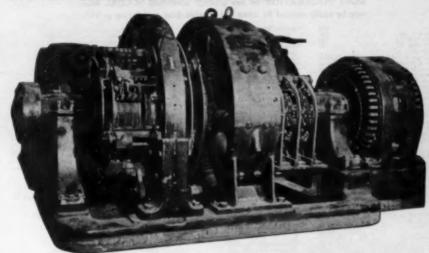
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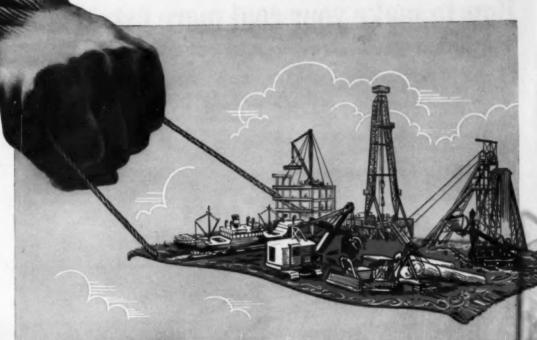
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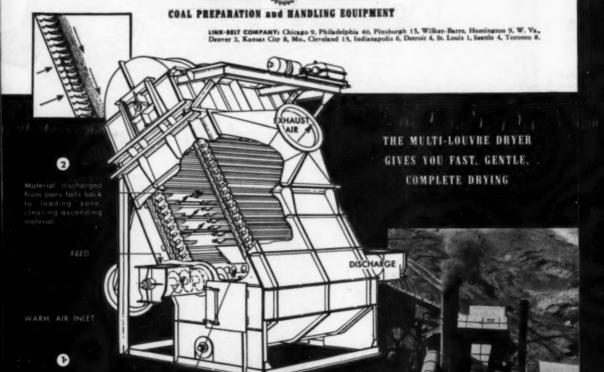
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